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THE RESTORATION of WATER LEVELS in the PEACE-ATHABASCA DELTA

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THE RESTORATION
of
WATER LEVELS
in the
PEACE-ATHABASCA DELTA

PROCEEDINGS
OF THE
PUBLIC HEARINGS

SEPTEMBER-OCTOBER 1973

ENVIRONMENT CONSERVATION
AUTHORITY
9912-107 Street
Edmonton, Alberta
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THIS VOLUME CONTAINS THE PROCEEDINGS OF
HEARINGS HELD AT FORT CHIPEWYAN, URANIUM CITY AND EDMONTON
TOGETHER WITH SUPPLEMENTARY SUBMISSIONS TO THE AUTHORITY

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FOREWORD

Slowly, over thousands of years, rivers flowing in the area at the west end of Lake Athabasca have formed there one of the world's largest fresh-water deltas. The Peace River, the Athabasca River and to a lesser extent the Birch River have laid down rich deposits of silt, continually creating new land and enriching that already existing through periodic overland flooding. One and one-half million acres have been gradually transformed into meadows, marshes and perched lakes, and this has become one of the most productive wetland areas known. Several species of food fish spawn and mature within the delta and its lakes. Large numbers of waterfowl use the delta for nesting, molting and staging. Muskrats thrive in the marshes and perched basins. Moose and bison feed in the sedge and grass meadows. And with these plentiful resources the delta has in the past successfully supported the native population of this area.

Recently and very rapidly, changes have occurred which immediately threaten the Peace-Athabasca delta and its residents. Since 1968 the levels of Lake Athabasca have become significantly less than average and the usual flooding has not occurred. Large mud flats have been bared, the perched lakes have become smaller and brush communities have become established on some of the meadows as the delta has become drier.

These changes can be traced to the raising of the W. A. C. Bennett Dam on the Peace River in British Columbia. It was completed in December 1967 and the filling of its reservoir, Williston Lake, which took place over the next three years coincided with the decline in delta water levels.

The Peace River is very important to the delta. Besides the additional water it brings— and it is a source of much of the life-giving overland flooding— it acts as a hydraulic dam during its peak summer levels, preventing water from flowing out of Lake Athabasca and the delta. Because of the lower levels in the Peace River resulting from the Bennett Dam, the Peace-Athabasca delta and its lakes have lost much water.

The drying of the delta, if allowed to continue, would result in irreversible changes in the delta ecology and the loss of this great resource. It was decided something must be done.

The delta, although located within the boundaries of Alberta, is of immediate concern to three governments. As the Chipewyan Indian Reserve lies entirely within the delta, and as 80 percent of the delta lies within Wood Buffalo National Park, the Government of Canada is directly involved. As a large portion of Lake Athabasca lies within Saskatchewan, the Government of Saskatchewan also has a vital interest in this area.

In January 1971 the Ministers of the Environment of Canada, Alberta and Saskatchewan established the Peace-Athabasca Delta Project Group, an interdisciplinary task force whose purpose was to investigate and report on the extent of low water levels in Lake Athabasca, their cause and their effect on the delta and upon the local people. The Project Group carried out hydrologic investigations and ecological, social, economic and legal and jurisdictional studies. Also, during the course of the study and pending final assessment of the situation, they undertook two interim measures to slow down the degradation occurring in the delta. The findings and recommendations of the Project Group have been published in its Summary Report of 1972 and its Technical Report of 1973.

The Environment Conservation Authority has been requested by the Government of Alberta to conduct hearings to examine the recommendations of the Project Group, the major one of which is to build a submerged rockfill weir on the Riviere des Rochers with the intent of duplicating as closely as predictable the historic water levels and fluctuations in Lake Athabasca and the delta.

As a background to the hearings the Environment Conservation Authority published both in English and in Cree a prospectus on "The Restoration of Water Levels in the Peace-Athabasca Delta." Its Public Advisory Committee on the Environmental Sciences appointed an *ad hoc* committee to provide for the hearings a critique of the Peace-Athabasca

Delta Project Group Technical Report. Position papers were prepared by the Departments of the Environment of Alberta and Saskatchewan and distributed prior to the hearings. The Alberta paper was published both in English and in Cree.

Supported by this background information, the Authority in conjunction with the Governments of Canada and Saskatchewan conducted public hearings in Fort Chipewyan, Uranium City and Edmonton in September and October, 1973. This volume contains the proceedings of those hearings.

ACKNOWLEDGMENTS

The validity of the recommendations derived from any public hearing rests directly upon the submissions made to that hearing. The Governments of Canada, Alberta and Saskatchewan are appreciative of the efforts made by those individuals, groups and associations who presented briefs at the hearings, as well as to those who helped with the preparation for the hearings.

It is desirable, especially for those preparing briefs, to have reliable information available regarding the subject under enquiry, before the hearings themselves. The long and hard work of those groups and individuals who studied the Peace-Athabasca delta and whose reports formed the backbone of the hearings is recognized and greatly appreciated. Of equal importance were those whose task it was to examine the findings of these studies, and the responsible manner in which this was carried out was of great benefit.

Special note should be made of the contribution of the local residents of the delta. Their long-standing experience with the delta has formed a basis for the understanding of this area and has been vital in the formation of plans to alleviate the undesirable conditions now imposed upon it. Their comments were pertinent and lucid, and constitute a reminder of the real issues at stake. The good quality of their submissions is in part a reflection of the very important liaison carried out before the hearings between the Government of Alberta and the community of Fort Chipewyan, and the efforts of those individuals involved are commended.

The vital job of providing on-the-spot translation during the Fort Chipewyan and Uranium City hearings was admirably performed by the Cree and Chipewyan interpreters. Appreciation is also due to the Environment Conservation Authority staff, who took care of the practical matters involved in organizing and conducting the hearings, and who will be putting out the resultant publications.

To all of these as well as to those interested people who attended the hearings or took the trouble to send in their written views, the governments involved wish to offer their commendations and express their thanks.

Dr. W. R. Trost,
Chairman,
Environment Conservation Authority.

THE RESTORATION
of
WATER LEVELS
in the
PEACE-ATHABASCA DELTA

INTRODUCTION

ENVIRONMENT CONSERVATION
AUTHORITY
ALBERTA

INTRODUCTION

The Environment Conservation Authority was requested by the Honorable W. J. Yurko, Minister of the Environment, to hold public hearings on the proposal to restore the levels of the Peace-Athabasca delta by construction of a weir on the Riviere des Rochers.

This proposal had been made by the Peace-Athabasca Delta Project Group after a detailed study of the delta following the construction of the W. A. C. Bennett Dam on the Peace River in British Columbia.

Intergovernmental Arrangements

Because of the involvement of Wood Buffalo National Park and of Lake Athabasca in the hydrology of the delta, it was decided to invite representatives of the Governments of Canada and Saskatchewan to participate in the hearings.

Accordingly, it was agreed that Mr. R. P. Malis, Director, Prairie Region, Parks Canada, and Mr. E. F. Durrant, Director, Western Region, Inland Waters, Environment Canada, would represent the Government of Canada on the panel for the hearings, and Mr. S. R. Blackwell, Chief, Water Management Service, Saskatchewan Department of the Environment, would represent the Government of Saskatchewan.

In addition, it was agreed that Mr. Blackwell would act as Chairman for the hearing at Uranium City and would bring on to the panel for that occasion Professor Stan Rowe, Chairman of the Saskatchewan Environmental Advisory Council, and Mr. Gordon Koshinsky, Fisheries Specialist, Department of Northern Saskatchewan.

Preparation for the Hearings

Background material was placed before the public in the form of a prospectus in English and in Cree, a situation paper by the Alberta Department of the Environment also published in English and Cree, and the Summary Report of the Peace-Athabasca Delta Project Group. These were sent out by direct mail to a widely representative mailing list and were also made available at the E.C.A.'s Information Centres.

A situation statement by the Government of Saskatchewan was also distributed by that government in the appropriate districts of Saskatchewan.

In addition, a special *ad hoc* committee of the Science Advisory Committee to the Authority undertook a review of the scientific and technical foundations for the recommendation of the Peace-Athabasca Delta Project Group. The committee's report on this review and their recommendations were not available prior to the hearings but were submitted at the Edmonton session and became the focus of considerable detailed discussion at that hearing.

Personal Contacts

Because of the primary importance of the delta to the local inhabitants and the native population in particular, special efforts were made to develop a personal association with the people of the area. In this endeavor, the very competent efforts of certain members of the Department of the Environment were most valuable. In addition, a meeting was held at Edmonton between the Authority and the chiefs of the combined bands and other community leaders to discuss the conduct of the hearings and establish a basis for mutual understanding and communication. These contributed greatly to the highly benevolent and constructive atmosphere of the hearings, particularly at Fort Chipewyan.

Publicity

Advertising for the hearings within the delta was mainly through the medium of posters and handbills which were widely distributed throughout the area in both English and Cree. Elsewhere, pictorial newspaper advertisements and radio and television announcements were employed.

At the hearing at Fort Chipewyan, interpreters were used to provide continuous translation of all English presentations into the Cree language. They also served to present in English those submissions that were made in Cree. A similar function was performed at Uranium City but the languages involved there were English and Chipewyan.

The Public Hearings

The first hearing was held at Fort Chipewyan on September 25th, followed by a second session at Uranium City in Saskatchewan on September 27th and the final session at Edmonton on October 2nd, 1973.

For the Alberta sessions, the Chair was occupied by Dr. W. R. Trost, Chairman of the Environment Conservation Authority, and the panel consisted of Mr. Philip Dowling and Mr. Julian Kinisky of the Authority, Mr. Ron Malis of Parks Canada, Mr. Fred Durrant of Environment Canada and Mr. Stan Blackwell of the Saskatchewan Department of the Environment.

At Uranium City, the Chairmanship was assumed by Mr. Stan Blackwell, with Mr. Dowling of the E.C.A. and Mr. Malis of Parks Canada, as well as Professor Stan Rowe of the Saskatchewan Environmental Advisory Council and Mr. Gordon Koshinsky of the Department of Northern Saskatchewan, making up the panel.

All sessions commenced with the presentation of the Peace-Athabasca Delta Project Group report by project leader Mr. Frank Forbes, followed by the Alberta situation paper delivered by its author, Dr. S. B. Smith of the Alberta Department of the Environment.

In addition, the Saskatchewan position paper was presented at Uranium City by Mr. Grant Mitchell, Deputy Minister of the Saskatchewan Department of the Environment, and at Edmonton by Mr. D. L. MacLeod.

The three sessions of the hearings took on recognizably different characters. At Fort Chipewyan, the presentations were made by local residents and tended to reflect the inseparable association between the delta and their lives. Thus it was that important sociological matters related to the delta but less directly related to the weir itself were brought forward.

At Uranium City the intense concern that characterized the Fort Chipewyan hearing was lacking and a more or less informal discussive type of meeting ensued from which no very clear-cut expressions of feeling emerged.

At Edmonton the character of the presentations was highly technical and the proposals of the Project Group came under very searching and highly competent scrutiny, especially from the *Ad Hoc* Committee of the Authority's Science Advisory Committee.

In all, a total of 47 submissions were heard and these together with the questioning by the panels and the discussion periods are presented verbatim in the following pages.

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THE PEACE-ATHABASCA DELTA
A CHOICE OF
WATER MANAGEMENT ALTERNATIVES

An examination of the effects on resources and people near Fort Chipewyan, Alberta, of remedial measures proposed to alleviate adverse conditions on the Peace-Athabasca Delta caused by impoundment of the Peace River by Bennett Dam in British Columbia.

by

S.B. SMITH

CHAIRMAN, RESEARCH SECRETARIAT

ALBERTA DEPARTMENT OF THE ENVIRONMENT

Approved and published
under authority of

THE HONOURABLE W.J. YURKO, P. Eng.
MINISTER OF THE ENVIRONMENT

This document has been prepared to facilitate discussion at public hearings by the Environment Conservation Authority on water management proposals made to the Governments of Canada, Alberta and Saskatchewan by the Peace-Athabasca Delta Project Group.

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INTRODUCTION

Two highly significant facts should be recognized by anyone interested in the Peace-Athabasca Delta - it is one of the world's great freshwater delta marshland complexes, and it has been home for a large number of Canadians for almost 200 years. It is no accident that Fort Chipewyan has provided a focus for entry to the Canadian Arctic, both as a major southern terminal of the Mackenzie River waterway, and as a center of fur trading in its own right. Thus, the early traders and travellers proceeding "from Canada by land" as Mackenzie expressed the culmination of his trip to Bella Coola on the west coast in 1793, as well as the original Indian residents of the upper Mackenzie system, were oriented to an important transportation and trading center, surrounded by a rich deltaic environment in an arc from northwest to southeast, and fronting on the Canadian Shield to the northeast.

Present patterns of human habitation and social structure of Fort Chipewyan have roots far deeper than most Alberta communities. Other than Indians, a large proportion of Alberta citizens have few Canadian antecedents over 100 years in the past. When Government or its agents cause changes in an environment such as the Peace-Athabasca Delta (as the British Columbia Hydro and Power Authority caused alterations in water levels by damming the Peace River) subsequent reactions can be expected by those affected by such man-induced changes. It would be a mistake to suggest that wide changes had not occurred in water levels in the Delta in the past; evidence is strong that they had. However, the record indicates that natural variations, whether toward higher or lower water levels, did not establish long term trends and reversed themselves within a few years. The impoundment of the Peace River, however, changed the fundamental relationship between Peace River flows and regulation of Lake Athabasca and the Delta marshlands to such a degree that recognition had to be given to the fact that drying of the Delta would be progressive, with continued regulation of Peace River flow in British Columbia, and that deleterious and irreversible changes would occur to ecological conditions on the Delta, without provision of remedial measures. Urgency was imparted to the situation on the Delta for several reasons. About two thirds of the affected marshland lies in Canada's largest National Park; the Delta complex is a staging area for more than 1,000,000 waterfowl from four continental flyways; navigation, was impaired on river channels in or adjacent to the Delta, because of low water. No factor, however, compared in importance or urgency with the fact that 1500 residents of the area were threatened with widespread and permanent damage to resources upon which they depended for sustenance, and the likelihood of community disruption because of the suddeness and magnitude of change in their way of living.

This report is not intended to provide only a summary of events concerning recent happenings on the Peace-Athabasca Delta, nor is it intended to recapitulate the reports and recommendations of the Peace-Athabasca Delta Project Group. Rather the position is taken that the research carried out by the Peace-Athabasca Delta Project Group provides at this time a reasonable basis for anticipating the future course of events, if the recommendations of the Delta Project Group are followed by the Governments involved.

The Minister of the Environment for Alberta has directed that public hearings be held before any major environmental management proposal of any kind is implemented in the Province. The scope of remedial measures proposed for water level improvement on the Delta affects 3000 square miles of Alberta and Federal land and a large number of Canadian citizens resident in the area. It is hoped that this report will provide a basis for public discussion which can lead to the maximum level of public benefits for all residents of the area, for other Albertans, and for Canadians everywhere who have an interest in the problem, because much of the affected area is in Wood Buffalo National Park.

1. THE PEACE-ATHABASCA DELTA

1.1 Geographic Location

For this report, an area somewhat larger than the actual Peace-Athabasca Delta is considered. The Delta itself is a little less than 1500 square miles, but its influence extends more nearly over 3000 square miles of upland, marshland and water-covered areas. As well, the lands which may infrequently be inundated, but which bear close relation to the Delta, its resources and the local residents, cannot easily be separated from any discussion of the Delta proper. A very considerable body of information has been assembled on the Peace-Athabasca Delta and the surrounding area, especially since 1970, when the attention of the public first was focused on this little known region (1).

Figure 1 shows an outline of the Province of Alberta, with the area to be discussed indicated as a shaded portion lying to the west of Lake Athabasca, about 350 miles northeast of Edmonton. As indicated earlier, the Delta is a natural terminus to travel routes from the south, east, or north. Stable, mature land surfaces in the active, outer edges of the Delta are not extensive, and most permanent habitation is located at Fort Chipewyan, on the non-deltaic Canadian Shield east of the delta and lying on the north shore of Lake Athabasca. Figure 2 shows the region immediately adjacent to Fort Chipewyan in more detail.

Access to Fort Chipewyan and the adjacent area is by air, by boat north from Fort McMurray or Saskatchewan to the east, during the ice free period, and by winter road from Fort Smith in the Northwest Territory. Geographical isolation has required that great reliance be placed on shipment of supplies by barge or air, or by truck haul in the winter. As well, outgoing products (fish, fur, lumber) are subject to the same transportation limitations as incoming supplies. Similarly, travel by local residents is by boat, air, snowmobile, dog team, or on foot, depending on circumstances and season. To a very significant degree, the geographic location and isolation of the Delta and its human inhabitants has shaped the destiny of the community of Fort Chipewyan, and determined the life style of its people.

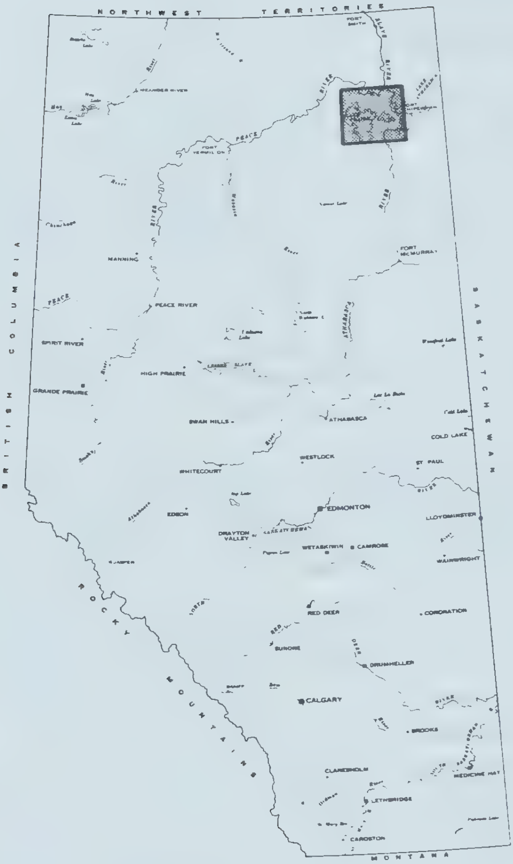

FIGURE 1: MAP OF THE PROVINCE OF ALBERTA, SHOWING THE PEACE-ATHABASCA DELTA STUDY AREA AS SHADED PORTION IN EXTREME NORTH EAST

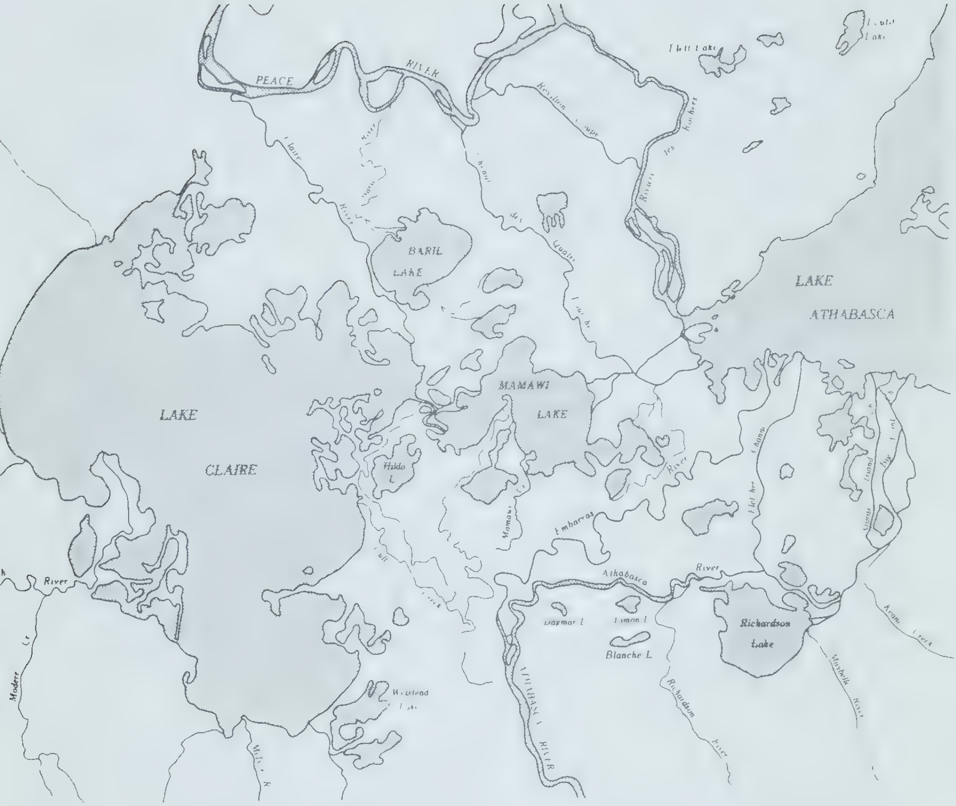

FIGURE 2
PEACE - ATHABASCA DELTA

SCALE: 1 inch = 10 miles

1.2 Historical Background

The community of Fort Chipewyan has existed for about 200 years. Residents have adopted a life style strongly oriented to their environment and the occupations of trapping, hunting and fishing. Thus, the relationship between human ecology and resources has become established not only as a means of survival in an often harsh environment, but also has become deeply ingrained as an historical social tradition in the lives of most members of the community.

Mentioned earlier was the evidence for wide variability in the Delta marshland environment in the past. Historical evidence indicates also (2) that a gradual shift has occurred from the function of Fort Chipewyan as a "staging area" for trappers and fur traders to that of a permanent, residential community at present. Very few permanent residences exist now outside of Fort Chipewyan on the upland, wooded Canadian Shield, on the south shore of Lake Athabasca, or along the river and delta channels. It is not possible from available records to determine accurately the past population density or distribution, or how or why these may have changed. Changes have occurred in the fur trade and in Government activities, which could have affected residential patterns. More recently establishment of schools, as well as increased social assistance probably have increased the numbers of permanent residents in Fort Chipewyan.

Activities of Delta residents predictably follow and are strongly influenced by the changing seasons. According to Weutherick (2) traditional patterns of community behaviour by 1900 may have begun a significant shift toward that of today, but old traditions die hard, and preparation of winter gear, such as clothing, snowshoes, sleds and the like, still has a significant place in the lives of many individuals in the Delta area. Winter is of course, coincident with the height of trapping activities. The community in the past has depended on muskrat as the dominant furbearer, and until comparatively recent times (3) the winter life of Fort Chipewyan was oriented almost entirely to the twin occupations of hunting and trapping, with some fishing with nets set under the ice, in order to obtain sufficient food. In the past also, considerable effort was expended in fishing for dog food, although this activity has decreased with the use of alternate methods of transportation, other than dog sleds. Spring and fall are difficult travel periods in the Delta area. Overflooding of surface ice often occurs in late winter or spring, and late fall or early winter ice thickness often is hazardous for travel. Net fishing traditionally has been carried out as required during any season, with fish being one of the important food items, both for humans and their dogs. Traditionally also, summer is used extensively for boat travel, and camping by families throughout the Delta is an activity still widely practised.

The foregoing brief summary of community behaviour patterns is intended only to indicate that the majority of residents of the Delta area still may be strongly influenced by old and stable traditions of resource use. Dependence by the residents on the Delta resources will be discussed later. Some younger residents have discarded completely the old dependencies and traditional occupations, and now have permanent jobs with Government agencies, airline or water transportation companies, or may be employed in lumbering or similar occupations. By and large, however, the community is still strongly oriented to the past, although signs of transition are evident. The importance of transition to possible new involvements, particularly with respect to the proposed remedial measures for water level improvement, will be discussed in a later section.

2. PEACE RIVER REGULATION IN BRITISH COLUMBIA

For several thousand years the Peace River, fed by its two major basin tributaries (Parsnip and Finlay), has carried downstream uncounted millions of tons of sediments each season. These sediments have built the Peace, Slave and Mackenzie deltas on which have become established plants and animals uniquely adapted to deltaic conditions. River channels and deltas are born, change, grow and die through the complex interactions of natural processes. These changes generally are slow, and communities of plants and animals and man usually can adapt to them. Regulation of the Peace River in British Columbia for hydroelectric power production produced changes of great magnitude, with sudden results. How these changes took place, and how the public and Government responded to them is briefly outlined below.

2.1 Relationship of Peace River Flows to Water Levels in Lake Athabasca

. Measurements have been made of flows on the Peace River for many years (3). As well (4), the relationship between Peace River flows and water levels in Lake Athabasca has been studied. High spring flows in the Peace River provided a hydraulic barrier against Lake Athabasca outflows. In addition, high flows on the Peace River, as well as impoundments on the Peace River caused by ice jams, caused the Peace temporarily to reverse its normal northward flow and to spill into the Delta and Lake Athabasca to the south. Thus, the water levels on the Peace River largely controlled the level of Lake Athabasca by impounding several feet of water on the lake each year. The impounded water flowed out during the late summer, fall and winter, with the result that water levels in the lake fluctuated from a high in mid-summer, to a low in early spring.

Regulation of the Peace River in British Columbia reduced the spring peak water levels in the Peace by several feet. As a result, Lake Athabasca peak water levels were also reduced by a substantial amount. Outward flows through the channels from Lake Athabasca increased with lower water in the Peace River, because their discharge capacity from Lake Athabasca is partly dependent on Peace River water levels. In summary, control of Peace River water in British Columbia had the direct effect of lowering the peak levels of the Peace River and Lake Athabasca.

2.1.1 Effects on Water Levels in the Delta Marshlands

During the late summer of 1968, after closure of the dam on the Peace River in British Columbia in December, 1967, some of the Delta lakes almost disappeared. The runoff in 1968 was lower than average, and coupled with virtually a total cessation of flow on the Peace River, effects were immediately felt on the Delta marshlands. It is known that water levels in Lake Athabasca control to a large degree the water levels in the shallow marshes of the Delta, and during the period 1968-1970 the peak levels in Lake Athabasca were about five feet below the long term average highs.

2.1.2 Public Recognition of the Delta Problem

Following the drastic reduction in water levels in the Delta, observations were made of the sequence of events occurring on the Delta marshes. It was known by the spring of 1970 that many Delta lakes had frozen to the bottom in the winters of 1968-69 and 1969-70. By mid-summer of 1970 it was also suspected that valuable habitat was unavailable to important fish and furbearing species.

Public attention was focused on the Delta water problem by publication of "Death of a Delta" in Edmonton by concerned scientists and others from the Government of Alberta, Government of Canada and the University of Alberta. By September, 1970, public knowledge of the Delta was widespread, and by early 1971 a decision had been made to hold a symposium on the Delta problem at the University of Alberta in Edmonton. A large amount of information was recorded and published in the proceedings of the symposium (5).

2.1.3. Action by Governments

Concurrent with preparations for public discussion, the responsible Ministers for Alberta, Canada and Saskatchewan agreed to establish a Delta Project Group, to study the problem and make recommendations to the three governments. By January 1971 the project study was under way. The initial report of the Peace-Athabasca Delta Project Group was published in 1971 (6); a summary report was published in 1972 (4); final recommendations were made by the Delta Project Group in 1973 (7).

In May, 1973 the Minister of the Environment for Alberta, the Honourable W.J. Yurko announced that the Environment Conservation Authority had been requested to hold public hearings on recommendations made by the Peace-Athabasca Delta Project Group for restoration of water levels on the Peace-Athabasca Delta. The announcement by the Minister is in keeping with policy stated by the Government of Alberta that no large-scale water or other environmental management project will be initiated in the Province without public hearings, in order that all Alberta citizens be provided with the opportunity to participate in the decisions affecting their environment.

2.2 Peace-Athabasca Delta Studies

The public hearings by the Environment Conservation Authority are the culmination of a long series of events, commencing in December 1967, when the B.C. Hydro and Power Authority closed the dam on the Peace River in British Columbia. Very detailed and extensive studies have been carried out, and it was in April, 1973 that the Delta Project office was closed, with submission of the final recommendations on restorative measures for the Delta marshlands. During the more than two years of study, a wide involvement of more than 30 agencies was achieved. The reports of the studies mentioned earlier, all show strong indications of concern for the people of Fort Chipewyan and their dependence on Delta resources. This report has the same kind of orientation, and as a consequence, less attention is devoted to the technical aspects of Delta ecology and hydrology, and considerably more to the relationship of the people to the resources of the area.

2.3 Recommendations of the Peace-Athabasca Delta Project Group

As mentioned earlier, three reports were produced by the Peace-Athabasca Delta Project Group. Each of these reports contained recommendations. The final report to the three Governments also has attached to it voluminous appendices, wherein are contained the technical data upon which the Delta Project Group based its final recommendations. It is necessary to clearly outline the major recommendations for remedial works (and the expected consequences) in some detail, because it is these which can have the most far-reaching effects on people of the Delta area. As well, mention should be made of possible downstream effects if the major recommendation for water control in Lake Athabasca is implemented.

2.3.1 Alternatives

There are at least three alternatives available for management of water levels in Lake Athabasca and the Delta marshlands:

(a) The situation could be left as at present, with a trend toward progressive drying out of the Peace-Athabasca Delta.

(b) The Delta water levels could be stabilized permanently, by erection of a regulatory dam or dams on the outlet(s).

(c) Partial control of outflowing water could be achieved by construction of a partial blockage on the major outlet channel, Rivière des Rochers.

No one, in a few months' study could predict with certainty the quantitative changes which might take place with any of the choices listed above. However, events following choices (a) or (b) are predictable in the broad sense. If the Delta continued to dry out, the marshlands would quickly be covered initially by deciduous trees, finally to be replaced by conifers. Eventually (100-200 years), a boreal forest cover would predominate over most of the present Delta marshland complex. If water levels were increased and stabilized by regulating the water regime, both external to and within the Delta, primary productivity would be sharply reduced (8). The large, shallow lake resulting from such an action would not provide the kind of habitat which in the past has resulted in the production of large numbers of muskrats, suitable spawning conditions for walleye, goldeye and pike, sedge meadows for bison, and optimum conditions, both in spring and in autumn, for staging waterfowl. Alternative (c) appears to be the only reasonable course of action to ensure the preservation of delta marshland productivity, and to prevent further changes of the nature already recorded by investigators (9).

The Peace-Athabasca Delta Project Group, in its final report (7) has made the recommendation that a submerged rock-fill weir be constructed at the Little Rapids site on the Rivière des Rochers, the main outlet channel from Lake Athabasca to the Slave River. According to the report, and the appendices attached to it, the submerged weir on the Rivière des

Rochers will provide enough check on outflow that Lake Athabasca will rise each spring during accelerated runoff to a level of about 689 feet above sea level (about the average peak level before regulation of the Peace River). Such a level is suggested in order that the Delta marshlands be flooded to approximately the same extent as that which existed in the past. The report anticipates also that Lake Athabasca will fall to a level of about 685 feet above sea level each winter. In general, the amplitude of fluctuation of water levels would be slightly less than before the Peace River dam was built. Shoreline zones would likely be slightly more stable. Biological productivity is estimated to be approximately the same as that which existed before the Peace River impoundment imposed a new and deleterious water level regime on the Peace-Athabasca Delta.

Several alternatives were considered for regulation of water levels which would approximate pre-impoundment conditions on the Delta marshlands. These varied from temporary ice dams, regulated flows by gated structures, partial constrictions of outflow channels, and regulation of the main flow in the Slave River itself. Details of construction and assessments of comparative advantages of the several alternatives are contained in the Technical Report and Appendices mentioned earlier (7). As well as the major control on the Rivière des Rochers, the recommendation was made by the Peace-Athabasca Delta Project Group that the dam on the Chenal des Quatre Fourches (already constructed) be removed, in order not to impair water quality in the basins whose water levels it affects.

2.3.2 Long-term Projections for Water Levels

Predictability of the water regime on the Peace-Athabasca Delta is the major key to estimating resource values. It was indicated earlier that historically the people of Fort Chipewyan were strongly oriented to biological resources of the area. These resources depend for their existence on the unique conditions to be found in the complex of basins, levels and channels which make up the Delta.

Under the regime envisaged in the report and recommendations of the Peace-Athabasca Delta Project Group, it is estimated that the variable, but predictable levels recorded in the past can be approximated for the foreseeable future, if the Rivière des Rochers weir is constructed. It is to be expected that there will be relatively drier and wetter years in the future, as there have been in the past. Consequently, both maximum and minimum water levels on the Delta will likely fluctuate outside the range of 685-689 feet above sea level. Annual flows on the Fond-du-Lac River in Saskatchewan (7 million acre feet) and the Athabasca River in Alberta (25 million acre feet) jointly make up the significant portion of the annual throughput of Lake Athabasca. The combined capacity of the two systems may vary substantially, which accounts for the predicted variability in water levels on the Delta marshlands. It is important to record that any significant storage projects which might be built on the Fond-du-Lac or Athabasca systems would have immediate impact on Lake Athabasca water levels and the water regime of the Delta, by lowering the spring and summer inflows to Lake Athabasca. It could be expected that initiation of any such storage of a significant nature on the major tributaries to Lake Athabasca would result in essentially the same kind of impact on the Delta as that caused by regulation of the Peace River in British Columbia.

2.3.3 Downstream Effects

Studies of the downstream effects of Peace River regulation have been concentrated largely in the region of the Delta. Below the confluence of the Peace, Slave and Rivière des Rochers, unquantified effects will result from regulation of levels in Lake Athabasca. At present, the outflows from Lake Athabasca are greatly accelerated by low spring water levels in the Peace River; the throughput of water from Lake Athabasca in effect compensates in part for storage achieved on the Peace River in British Columbia. It properly cannot be said, therefore, that storage of water behind the Rivière des Rochers weir affects the lower Slave and Mackenzie, but rather, such storage makes more apparent the true impact downstream of storage on the Peace River in British Columbia. Thus, any measures considered necessary to returning Lake Athabasca and the Delta to a more "natural" state, will result from the operation of the hydrodam on the Peace River. Further, any downstream effects caused by remedial measures should be assigned to the operation of the dam in British Columbia, and not to implementation of restorative programs in Alberta.

2.3.4 Environmental Impacts

It has been stated earlier (page 9) that of the options available, the only reasonable course appears to lie in effecting at least partial control of waters outflowing from Lake Athabasca and the Delta, to ensure preservation of deltaic marshland productivity. As also indicated earlier, such a course would return the Delta to a condition where inflowing water through the Fond-du-Lac and Athabasca systems would provide a water regime on the Delta which would be subject to the vagaries of nature. Such a water regime would be much more akin to the "natural" state which existed prior to construction of the dam on the Peace River in British Columbia than that which exists at present.

Thus far, this report has dealt with the identification of the Peace-Athabasca Delta as a unique geographical entity, with a highly important social and historical background, covering nearly two centuries in time. In addition, the relationship of Peace River flows and their relation to Delta water levels and resources has been examined, as well as the restorative measures recommended by the inter-governmental Peace-Athabasca Delta Project Group.

Focus should now be directed to the environmental consequences of implementing the basic recommendations in the final report of the Peace-Athabasca Delta Project Group. In providing such an analysis, the assumption is made that restorative measures will be effected in the near future. A second assumption is made that the method of achieving full restoration of a "natural" water regime on the Delta is less important than is the likelihood of maximizing Delta productivity for the use of Delta residents.

During the past few years, several techniques have been developed for depicting the complex interrelationships of an activity by man and one or more environmental systems affected by that activity. One such technique involves the construction of an "environmental impact matrix" which represent graphically activities on one axis of a grid, and affected environmental systems or components of systems on the other axis. The technique allows an estimate to be made of negative or positive impacts of any kind on any kind of system, whether biophysical, ecological or cultural. The environmental impact assessment may be quantified by assigning a range of values to the magnitude and importance of the effect of an activity on existing characteristics and conditions of the environment. In the present use of the matrix, values were assigned subjectively on estimates by the writer of the magnitude and importance of effects of activities directly related to proposed construction of the Rivière des Rochers weir and the removal of the Chenal des Quatre Fourches dam, the latter which had been built as a temporary expedient, to flood wetlands in Wood Buffalo National Park, until a permanent remedy could be found to restore the Delta as a whole.

Examination of the effects of the proposed activities culminating in restoration of Delta water levels leads to the conclusion that virtually all environmental impacts are positive. It is not necessary therefore to consider in any detail the weight of minor disbenefits, but rather to estimate the magnitude and importance of benefits which will accrue if Delta water levels are restored. Considerable confidence can then be held in the predictability of extent of resource use on the Delta which can take place in the future, plus the degree to which such resource use may contribute to the well-being of the Delta residents.

3. THE DELTA RESOURCES

The resources of the Peace-Athabasca Delta are many and varied. It is difficult for one who does not live in the area to estimate their values to those who reside there. The life style of Delta residents is uniquely adapted to, and dependent on, their natural surroundings. The following summary will only provide a catalogue of the major resources available for use to the people of the area. For convenience an arbitrary division has been made in resources of the area, by dividing them into biological and non-biological categories. Biological resources of importance to Delta residents include mammals, birds, fishes and some species of vegetation; non-biological resources include minerals, the potential tourist industry and employment opportunities in the transportation industry, Federal or Provincial Government, or supportive service industries. An attempt will be made to identify the present kind and level of resource development and its present actual and future possible relationship to the community of Fort Chipewyan.

3.1 Biological Resources

The Peace-Athabasca Delta is rich in biological resources. Marshlands of the Delta consist of warm, shallow water-covered areas, where primary productivity is high. With a high level of insolation energy and nutrient enrichment provided each spring from the silt carried by the inflowing river waters, conditions are ideal for a variety of plant growth. It is the rich plant growth which sustains several species of birds and mammals, and in some cases provides spawning or rearing habitat for fish.

The large sedge and grass meadows are typical of marshland plant associations, and the several thousand bison of the Delta depend on these meadows for feed all year. Farther back from the open water-covered areas, willows and other deciduous species provide moose habitat on which depend the several hundred moose of the Delta proper. Bison are relatively unused by Delta residents. Hunting within Wood Buffalo National Park is not allowed, and availability of bison outside the Park is limited and infrequent. Moose are heavily utilized, to the point where the Delta population of moose is below carrying capacity. Black bears are taken when available, but are not as common on the Delta as on the Canadian Shield woodland habitat to the northeast of Fort Chipewyan. No other large mammals are found in sufficient numbers on the Delta to be of significant value to local residents.

The Delta marshes and mud flats provide an important piece of habitat for waterfowl. As a staging and resting area for waterfowl, both on northward and southward migration, and as a feeding, moulting and breeding area, the Delta may harbor well over 1,000,000 ducks, geese and swans in a single season. The unique character of the Delta marshlands makes it a key element of great importance to waterfowl of four continental flyways.

Little information is yet available concerning the relationship of Delta waters to fish production in the area. It is known that walleye from Lake Athabasca spawn in Richardson Lake, which may be the single most important walleye spawning area for Lake Athabasca. Lake Claire and Mamawi Lake may also provide some spawning habitat for walleye, but little is known yet of the importance of those waters to Lake Athabasca walleye.

Recent studies confirm, early but scant information on goldeyes, which live in the Peace River and move upstream into Lake Claire to spawn. Larval goldeye spend some time in Lake Claire before moving back into the Peace River to complete their life history.

Northern pike are common throughout the Delta area, and very large fish (in excess of 20 pounds) are not rare in some of the Delta river channels. Spawning requirements for pike are such that it is likely that the margins of the Delta lakes where flooded grassy areas are available, may be important for successful reproduction.

Whitefish are common in the shallow waters of the west end of Lake Athabasca, as are tullibee. Lake trout are found in the deeper, cooler waters of the main body of Lake Athabasca. None of the three species mentioned above inhabit the Delta proper, but all rely for successful spawning on suitable beach substrates. Low water in Lake Athabasca could have serious consequences for maintenance of whitefish, tullibee and lake trout.

The single most important species of animal on the Delta is the muskrat. It has provided the basis for the fur trapping industry at Fort Chipewyan for well over 100 years. Water levels on the Delta marshes are critical for the production of muskrats. Not only do suitable water levels result in the production of plants which are eaten by muskrats, but also sufficient open water under the ice is critical to mobility of the animals in reaching their food supply. Furs in 1973 reached very high prices with muskrats averaging over $3.00. If 100,000 muskrats had been trapped in the winter of 1972-73 (as some Delta residents state has happened in the past) over $300,000. could have flowed into the community of Fort Chipewyan from this source alone.

Timber harvesting in the area has in the past provided employment for a limited number of residents of Fort Chipewyan. Because logging activities are not centered near the town of Fort Chipewyan, interest is not high in the timber industry. A potential source of revenue for the local residents exists in the so-called "diamond willow" of the area, which has extensive stands of this species. The wood is peeled of its bark and used for the manufacture of a variety of objects, including furniture such as chairs, lamp stands, and similar objects. A steady supply of driftwood is available along the numerous river channels, where trees often fall into the water from eroded banks. The potential for sale of driftwood for ornamental objects is not known, but the supply is virtually unlimited.

3.2 Non-biological Resources

Traditionally, residents of the Delta area have not been heavily involved in use of non-biological resources. Nor have they been able to take advantage of the resources of transportation employment or employment with Government to any significant degree. Most Delta residents have little training which might suit them for employment in technical or skilled occupations, and also, employment might result in having to relocate outside the community, which in the past has discouraged many older residents of Fort Chipewyan from involvement in occupations other than trapping, fishing and hunting.

Through much of northern Canada, minerals provide a base for resource development. While mining for metallic minerals has been the major reason for development of numerous communities elsewhere, no metallic ore deposits of significance apparently exist near the Delta. As a result, little direct effect has been felt in the community. In addition, mineral exploration to date has not revealed petroleum or other fossil fuel resources in close proximity to the Delta area or the community of Fort Chipewyan.

Potential for employment in Government service rests largely on decisions which may be made by Governments as to the desired level of activity in the Delta region. During the research program by the Peace-

Athabasca Delta Project Group, local residents were employed whenever possible. It is not known yet what Government activities may continue to offer employment, but jobs are directly related at present to expenditure levels of Federal and Provincial agencies, supplemented by modest and infrequent research efforts by research branches of Government or by University research programs.

Perhaps largely as a result of location, Fort Chipewyan has received little benefit from oil or gas pipeline environmental impact studies. Largely because of location also, Alberta oil sand activities have had little effect on the local community, although employment has been possible for those who choose to move to Fort McMurray or Fort McKay, to work in oil sands development projects.

The general picture at present is not encouraging for benefits to Fort Chipewyan from involvement with non-biological resources. Jobs are not plentiful in the Delta area, and are generally available only for short time periods for unskilled persons. For those with more advanced educations and skills, better opportunities appear to exist in other areas.

4. THE PEOPLE OF THE DELTA

The history of occupation in the Peace-Athabasca Delta area (2) and the present social structure of Fort Chipewyan (10) have been examined and reported on previously, in the Proceedings of the Symposium held on the Delta problem in 1971 (5). A brief recapitulation is provided here, in order to orient the present and possible future resource use discussion to follow in Sections 5 and 6.

4.1 Crees

The present social organization of the community of Fort Chipewyan is strongly influenced by Cree traditions. Not only was social organization practiced much earlier by Crees than any other woodland Indians of Central Canada, but also they rapidly adapted to the first European intrusions, as well as taking unto themselves the skills and materials of the white traders and explorers, without giving up their own language and traditions. Perhaps because of their numerical strength (which comprises 47% of the population of Fort Chipewyan) as well as their social influence by tradition, the Crees are the dominant segment of the community at present.

4.2 . Chipewyans

Of the population of Fort Chipewyan, 15% are native Chipewyan people, and other than the few whites, this represents the smallest identifiable segment of the community. In the past, the Mackenzie Indians, including Chipewyans, accepted European culture more rapidly than Crees, and came close to extinction as a cultural group. As a result, the Chipewyans of the Delta have not maintained as strong an identity as have the Crees. Nevertheless, the Chipewyan Indian Band numbers more than 230 persons, and with the Crees have a place of importance in any considerations of resource development or environmental management.

4.3 Metis

The Metis of Northern Canada exist in every remote community, and Fort Chipewyan is no exception. The Metis of the Delta area have intermarried with both Chipewyans and Crees, but under the law, are not accorded the status given to native Indians under Federal legislation. As a group in the social structure of Fort Chipewyan, the 450 Metis are a highly significant entity, comprising the second largest group (33%) in the community. The Metis members of the community provide significant inputs to leadership and organization. Perhaps because they are not given a status as native people, and have no reserves, their mobility is generally greater, and their attitudes to changing conditions are relatively flexible.

4.4 Others

In addition to the Cree, Chipewyans and Metis of the Delta area, there are in Fort Chipewyan or nearby, a few more than 100 white residents. Some are public servants, employed by various Federal or Provincial agencies, transportation employees, local businessmen and a few trappers. Some of the white residents of Fort Chipewyan have lived in or near the community for many years, and have assumed a place in the community life of the area. Others have been more transient, as business interests or employment opportunities dictated. The white segment of the community of Fort Chipewyan is numerically weak, but influential in local affairs.

The Indian and Metis people of Fort Chipewyan will increase by about 35% in the next eight years, if present trends continue; the non-native population is unlikely to change much, unless new events of significant importance alter the basic community support systems. The future therefore should be judged in relation to the needs of the majority of Delta people, plus the requirement for increased employment opportunities, as the population grows.

5. HISTORICAL AND PRESENT RESOURCE USE IN THE DELTA AREA

5.1 Dependence on Biological Resources

It has been substantially documented (2) that the community of Fort Chipewyan has been the focus of resource activity for a very long time in the southern end of the Mackenzie River basin. As well, it has been reported (11) that a heavy dependence has always existed on biological resources of the area by Delta residents. Thus the following analysis assumes that the relationship between human ecology and biological resources in the Delta is fundamental to any consideration of historical and present resource use in the area.

5.1.1 The Past 200 Years

For about two centuries the people of the Delta area have been steeped in the traditions of their several cultures, heavily influenced by European technology. Although large changes have occurred, and the pace of change today may be accelerating, it would be a mistake to assume that patterns of living have shifted in any fundamental way. Over the past 200 years, ungulates and fish have sustained life by providing food, and some degree of purchasing power has always existed with the yearly harvest of furbearers.

The environment in the Delta has always been harsh for its residents. Yet, without much direct assistance until comparatively recent times, the number of people in the Delta has slowly increased, and consolidation of residential patterns has resulted in the permanent community of Fort Chipewyan. The only resources of any consequence which could have resulted in survival of human settlement are those which in themselves have evolved in response to deltaic conditions. It has been suggested that the history of resource use in the Delta has shown a steady progression away from fur trapping, fishing and hunting. No published evidence exists to support such a contention, nor does contact with local residents suggest that the patterns of resource use of the past two centuries have passed into oblivion.

5.1.2 The Present Situation

While it has been strongly suggested in the preceding section that dependence on biological resources of the Delta still strongly influences life patterns of local residents, the vicissitudes of climate have in the past made it difficult to depend on such resources with great certainty. Years of drought sometimes resulted in virtual elimination of muskrats for a few years. Lately, fluctuations in demand for furs caused prices of muskrat skins to fluctuate six-fold. Several years ago muskrat skins sold for as little as fifty cents each. At the 1973 spring fur auction in Edmonton, they would have brought $3.00 each. Supply of fish, and ungulates has been somewhat more predictable, since these animals occupy habitat not as drastically affected by fluctuating water levels in the marshlands, which make muskrat survival dubious in low water years. Commercial fishing results in variable returns to residents of Fort Chipewyan. Distance from markets, plus the expense of air freight charges for highly perishable fresh fish impose severe limitations on successful maintenance of an economically viable operation.

As far as can be determined, use of fish and furbearers has not had the benefit of long-range planning by Government either at the Federal or Provincial level, although assistance to fishermen has been supplied by Federal programs, through provision of fishing boats and gear. Transportation companies have not made much effort to encourage shipment of fish at backhaul rates whether by air or barge. Transfer of all operations of the Freshwater Fish Marketing Corporation to Saskatchewan has posed an added difficulty for fishermen to ship their fish.

In summary, biological resources (fish, furbearers, birds, ungulates) at present provide a maintenance living for a number of Delta residents. It is difficult to project increases in exploitation of these resources, under present conditions.

6. PROSPECTS FOR THE FUTURE

The foregoing discussion has attempted to set the stage for evaluation of future prospects. In Section 2.3.1 the three alternatives for water regimes on the Delta were outlined, and the assumption made that the only reasonable course of action involved construction of a submerged weir on the Rivière des Rochers, following which the Delta would be returned to a condition approximating that which occurred before the Peace River was impounded in British Columbia. The following discussion related to the effects of such an action on the people of Fort Chipewyan.

6.1 Delta Productivity

Intensive studies of the hydrology and ecology of the Peace-Athabasca Delta in the past two years strongly suggest that productivity of the area will be little different after the construction of a regulating weir on the Rivière des Rochers than it was before the Peace River was brought under regulation. Implications for the future are therefore entirely dependent on the predictability of water levels on the Delta and subsequent productivity of the Delta area. According to mathematical models which can use hydrologic or ecological data, predictability is good. The analysis which follows therefore assumes that sufficient knowledge exists to state with reasonable confidence how regulation of Lake Athabasca and Delta water levels will provide Delta residents the opportunity to develop and use the resources of the area.

One other point should be made clear - it would be naive to suggest that the ecological situation on the Delta is simple; obviously it is not. However, the complex interrelationships of the water regime and the plant and animal communities should not be viewed as in any way limiting the proposal to return the water regime to its pre-impoundment state. Indeed, the reverse is true, and the highly complex interrelationships resulting from flüctuating water levels of great variability provide in turn the biological variability which makes possible a viable and productive ecosystem.

6.2 Resource Use in the Alberta Portion of the Delta

Consistent with regulation of Lake Athabasca and the Delta water levels to achieve and maintain a high level of productivity, at least five major resource potentials can be identified. Development potential is most readily apparent in (1) Fur trapping (2) Commercial fishing (3) Tourism (4) Sport fishing and (5) Sport hunting. These resource areas have been suggested as having obvious potential for development; as well, they are all highly labor intensive, which should be advantageous in a community where employment opportunities are restricted.

6.2.1 Fur Trapping

At least one study (10) has indicated that substantial income could be generated from the fur resources of the Peace-Athabasca Delta. It was also mentioned earlier in this discussion that a potential of about $300,000 might have been realized on the Delta in 1973, from muskrat alone, had there been animals to trap. Some local trappers and their families have in the past trapped up to 10,000 muskrat in a single season (12). At 1973 fur auction prices, such a harvest could have realized over $30,000 cash income. Fur prices however, fluctuate drastically, and it is difficult to predict the future economics of the fur industry. Nevertheless, it would be a serious error to make the assumption that fur is not important to Delta residents. In any assessment of the impact of the proposal to regulate the Rivière des Rochers and restore water levels on the Delta marshlands, fur (especially muskrat) must be recognized as a most important resource.

6.2.2 Commercial Fisheries

Assuming that fish productivity remains high, potential for further development of commercial fisheries also is high. One study (13) has estimated that a potential exists for harvest of about 5,000,000 pounds per year of commercially saleable fish. Five fish species are available for harvest - walleye, pike, whitefish, suckers and ling. As well, some potential is available for harvest and local processing of goldeye. If the estimate of 5,000,000 pounds per year is at all close, and at a conservative net price of 10 cents per pound, the cash flow into the community of Fort Chipewyan could approximate $500,000 per year, or slightly over $300 per capita. Aside from employment directly in the net fishery for the various species, processing of fish could also provide a number of shore-based jobs in dressing, filleting and repacking of fish for shipment to southern markets.

The future of commercial fishing at Fort Chipewyan is dependent not only on the supply of fish. Markets are far to the south, and the flow of fish must be steady, of high quality, and at a cost which can provide a reasonable income to the fishermen and shore-based workers. No long-range plans exist as yet for adequate and reasonably priced air transport of fish products from Fort Chipewyan, and the nearest fish plant of the Freshwater Fish Marketing Corporation is in Saskatchewan. In 1970, a newly formed fishermen's co-operative commenced operation at Fort Chipewyan, with limited success. Stability in the fishery, therefore, will require solid planning, in relation to water levels and also in relation to sustained maximum yields and sales of fish and fish products.

6.2.3 Tourism

Little concrete information presently is available as to the development of a tourist industry for the Peace-Athabasca Delta, although the data which do exist indicate that a major tourism potential might be developed. However, at present, there is very little tourist use of the area. Although tourism itself cannot be classed as a biological resource, obviously the animals and plants of the Delta would relate strongly to tourist appeal. Marshland areas generally have a rich complement of floristic and faunistic species, and the Peace-Athabasca Delta is no exception. No detailed studies exist of tourist potential, but in Europe and the U.S., areas of lesser potential than the Delta long have been recognized as visitation centers for naturalists, bird watchers and the like. Recently, frequency of enquiries from Europe has increased, and the opportunity appears to exist for Government and the air transportation companies to explore the possibilities of a sharply expanded tourist industry. There is little doubt that the construction of a weir on the Rivière des Rochers would have the positive impact of providing conditions which could maximize tourist use of the Delta. As in the case of commercial fishing, tourism is heavily labor intense.

6.2.4 Sport Fishing

The Peace-Athabasca Delta provided an abundance of opportunities to fish for trophy pike prior to 1968, before water levels were altered by regulation of the Peace River. In addition, walleye sport fishing was excellent. It can be assumed that fishing for pike and walleye will be as good in future as in the past, if water levels are restored by construction of the regulatory weir on the Rivière des Rochers. Intensity of sport fishing in the Delta channels has never been strong, but quantitative information is not available. All that can be said at present is that the potential is high, and that the same fishermen who fish commercially could also use their boats to cater to sport fishermen.

6.2.5 Sport Hunting

Sport hunting at present is not practiced to any significant degree in or near the Delta marshes. The few outsiders who have hunted there have, however, indicated that superlative waterfowl hunting opportunities exist on some portions of the Delta. Knowledge of land forms and future water levels is essential before any predictions could be made of the long-term future of sport hunting for waterfowl, and it is assumed that this knowledge is now available from the recent studies by the Peace-Athabasca Delta Project

Group. Internal regulation of water in the Delta could effect improvement in waterfowl hunting for sourthern Alberta (and the U.S.). However, such improvement would not benefit Fort Chipewyan unless the management scheme were also designed to take full advantage of hunting opportunities in the Delta area and to employ native people in transportation and guiding services. As with sport fishing, the dollar potential is unknown, but probably high. It should be emphasized that any development of sport hunting opportunities would be restricted to areas outside Wood Buffalo National Park.

6.2.6 Other Resource Use by Delta Residents

Resource use opportunities in the Alberta portion of the Peace-Athabasca Delta appear to be severely limited in the non-biological resource field. Apparently there are few economically recoverable mineral resources, although some excellent colored granites are exposed surficially. As indicated earlier, mineral exploration has not revealed petroleum or other fossil fuel resources. Development of the Alberta oil sands presently centers on Fort McMurray, 150 miles to the south. Insofar as oil sand reserves are presently known (14), further oil sands development will not directly involve the Delta residents or the community of Fort Chipewyan, except as a source of employment opportunities for those who might wish to relocate. As a consequence, it is difficult to see how mineral resource development in general (barring new discoveries in the area) and oil sands development in particular, can directly benefit those who wish to remain in the community of Fort Chipewyan or the surrounding Delta area.

6.3 Resource Use in Wood Buffalo National Park

The basic assumption is made that future physical resource development will not take place in Wood Buffalo National Park, in line with publicly stated National Parks policy for the rest of Canada (15). If such an assumption is valid, use of resources in Wood Buffalo National Park will be largely non-consumptive. It is recognized that fur trapping at present is carried out in the Park, and that a potential exists for a goldeye fishery in or adjacent to the Park. The future of such activities is by no means clear, because firm policy has not been publicly stated by the Federal Government.

Almost no use of Park resources is made at present by Canadian or non-Canadian bird watchers, tourists, naturalists, wildlife photographers, or those with similar inclinations. The available floral and faunal resources of Wood Buffalo National Park are probably less known to the Canadian public than any other National Park established for the same length of time. Yet the rich diversity of plant and animal life in the Park, as well as the rest of the Delta area, provides an immense potential, which could allow the Delta portion of Wood Buffalo National Park to become one of the best known such areas in the world. The Delta portion of the Park could achieve its true function as one of Canada's most valuable National Parks, as well as recognition as a unique natural area and one of the great freshwater deltas of the world.

Local residents, on foot in winter months or in suitable boats or canoes in summer, could provide the means of creating an awareness of resources in Wood Buffalo National Park which have thus far gone largely unnoticed. With adequate integration of resource potentials in the Park with the capabilities of local residents, it is obvious that the extensive marshlands within the southeastern (Delta) portion of the Park are highly useable, and have a high potential for generating employment opportunities in tourist services.

Regulation of water levels by the Rivière des Rochers weir appears to provide the only reasonable alternative for making non-consumptive resource development opportunities in Wood Buffalo National Park available to Delta residents. Thus, the potential impact of the weir has very wide and important consequences for Canada's largest National Park and 1500 Canadian citizens in the immediate vicinity.

6.4 Resource Use Outside the Delta Proper

Examination of resource use potential, as well as future prospects, has been confined so far to the Delta itself, either in Alberta or in Wood Buffalo National Park. With respect to tourism and sport fishing particularly, there are two areas of outstanding beauty and high potential near the Delta but not part of it, i.e., the Canadian Shield in Alberta, north and east of Fort Chipewyan, and the Athabasca Sand Dunes, south and east along the south shore of Lake Athabasca.

6.4.1 Canadian Shield in Alberta

The Canadian Shield in Alberta is one of the most attractive parts of the Province. Covering about 3000 square miles, it contains several hundred lakes with excellent fish populations, many hundreds of miles of clean sand beaches and topography and vegetation in a state of pristine beauty. Fort Chipewyan would be a logical center for tourist operations in the Shield area, and its residents would be the logical choice to provide services to visitors.

6.4.2 Athabasca Lake Sand Dunes

During the post-glacial period, wind erosion has resulted in deposition of Athabasca sandstone in large dunes east of the Athabasca River, south of Lake Athabasca. The dunes are of spectacular beauty, and have on them endemic species of plants and animals. With care, the dune areas could be preserved for the foreseeable future as glacial relics of great interest to naturalists, scientists and other visitors to the region. As in the case of the Canadian Shield north of Fort Chipewyan, the dunes could become a visitation area centered on Fort Chipewyan, and with transportation and guiding services provided by local residents.

6.5 Community Development

Community development anywhere ultimately depends on the local residents, and perhaps this fact is more important in isolated communities than elsewhere. Fort Chipewyan in a sense is suspended between life in the past and dimly perceived prospects for the future. Residents of Fort Chipewyan have always existed under hostile environmental conditions. As well, economic viability was never realized by the community.

Transition from the past has been slow, but by about 1965 the people of the area had begun to perceive that a relatively productive life could lie ahead for themselves and their children, with effort on their part, and with help from Federal and Provincial Government agencies. Closure of the dam at Portage Mountain on the Peace River in British Columbia, with resulting extensive environmental consequences, initially caused a withdrawal from active planning for the future. Lately however (16), community interest has increased sharply, and expectations appear to be high in local residents that future planning can be based on the report (7) recently published by the Peace-Athabasca Delta Project Group.

6.5.1 Technical Training and Development

Post-grade school education for Fort Chipewyan residents is not available in the community. Employment opportunities are so restricted that no impetus is provided, or demand created for employment of those above the level of unskilled physical labor. Increasing numbers of young people (12) are expressing a preference for relocation elsewhere, where employment opportunities are more numerous and more variable.

Future training and education at the level of technical institute or equivalent will be necessary to fit young Delta residents for the task of optimizing resource use in the area. Obviously, unless there are opportunities for resource use, such training would be wasted. For the future, technical training and education must be considered in relation to the planned opportunities for local involvement in use of the resources of the area, if the water level management proposals are implemented.

6.5.2 Government Services and Employment

Opportunities for further community development are closely related to the level of activity generated by Government and allied services. At present, employment of local residents in technical or supervisory positions is virtually non-existent, largely because of lack of training and education of local people past the grade school level. Depending on Federal Government policies for Wood Buffalo National Park or Alberta Government policies for the Delta area under Alberta jurisdiction, job opportunities could be increased in direct proportion to any increases in activity by the respective government jurisdictions.

Further studies may be in prospect for the hydrological and ecological consequences of implementing the Peace-Athabasca Delta Project Group recommendation to regulate the Delta water levels by means of a weir on the Rivière des Rochers. If such is the case, jobs could be available for local residents. The Delta studies have already generated huge amounts of data, now available to researchers through the Alberta Department of the Environment. Future opportunities for research are virtually unlimited. If a permanent research facility were to be established by a joint effort of Alberta universities, the Government of Alberta and the Government of Canada, a significant increase in job potential for Fort Chipewyan residents could result. Again, as in the case of training and education, long-range projections are needed at this time, to integrate the planned Government activity levels to resource development, and particularly in relation to the consequences of the environmental management proposals contained in the final report (7) of the Peace-Athabasca Delta Group.

7. MANAGEMENT DIRECTION

7.1 Governments

This position paper has attempted to focus attention on the resources of the Peace-Athabasca Delta, and to examine the potentials which might exist for use of those resources by the people who reside there. Primary focus has been on the consequences of implementing the management proposals made to the governments of Canada, Alberta and Saskatchewan. It will be the responsibility of the three governments to decide whether or not to follow certain courses of action. Each of the governments has interests which require decisions of significance to its own sphere of responsibility, yet each interest is affected by and closely linked to the interests of the other governments.

7.1.1 Canada

The Government of Canada has primary interest in and jurisdiction over Wood Buffalo National Park. Whatever decisions are taken (or not taken) with respect to regulation of water levels in the Delta area have immediate and long-term consequences. Further, the Government of Canada has responsibility for a large proportion of Delta residents who are Indians. Transportation facilities to and from the Delta are under Federal jurisdiction. One of the major resource potentials (commercially saleable fish) is closely tied to the operations of the Freshwater Fish Marketing Corporation, created under Federal legislation, but having Provincial involvement.

7.1.2 Saskatchewan

The Government of Saskatchewan has jurisdiction over resources in Lake Athabasca within Saskatchewan. The fishery resources in Saskatchewan may not have been affected as obviously as in Alberta, but the walleye fishery in Saskatchewan is at least partly dependent on spawning areas in Alberta. The possible effects of low water in Lake Athabasca on lake trout, tullibee or whitefish is not known, but low water in other lakes has resulted in decreased spawning success for beach-spawning species. Of concern to the Government of Saskatchewan is development of its own water resources on the Fond-du-Lac River system, which delivers about 20 percent of the inflow to Lake Athabasca. Any storage on the Fond-du-Lac system in Saskatchewan would have similar effects on the Delta as storage on the Peace River in British Columbia.

7.1.3 Alberta

The Government of Alberta has jurisdiction over its resources within Alberta, in a similar fashion to the jurisdictions of Canada and Saskatchewan. An important distinction, however, should be made as to the relative importance of jurisdictional responsibilities. It is one thing to recognize that legislation and geography provide constraints and responsibilities for Government. It is quite another thing to recognize that aside from the responsibilities resulting from statutes and location of political boundaries, the well-being of Canadian citizens is paramount.

Alberta thus has the major responsibility for the future of the Delta, in relation to the people who reside there.

All the available evidence concerning human habitation of the Delta strongly points to maximizing social and economic benefits through increased use of Delta resources by local residents. There appears to be available, a relatively straightforward engineering solution to the water level problem. In terms of social and economic benefits if successful remedial measures are undertaken and in terms of future social and economic costs if they are not, the capital costs for restoration of water levels in the Delta are relatively small. The impacts of the proposal for construction of the Rivière des Rochers weir are positive.

The assumed positive benefits or the possible disbenefits of remedial action on the Peace-Athabasca Delta relate most strongly to the Government of Alberta. It is within Alberta that the present problems exist; it is within Alberta that the people of the Delta live. The flow of commerce into and from the Delta connects most closely with the Alberta scene. Government and other services center at Fort Chipewyan, a community for which the Government of Alberta has ultimate responsibility. Notwithstanding that the Government of Canada and the Government of Saskatchewan have special and important interests in the region, it is the Government of Alberta which is required to assume the most significant role in the future of the Delta and its people.

It is the conclusion of this report that the initiatives for future management direction of the Peace-Athabasca Delta should relate most strongly to the Government of Alberta, with close liaison with the Government of Canada and the Government of Saskatchewan. It is also the conclusion of this report that with imaginative and positive management direction, as well as with involvement, determination and effort by the local people, there is a good probability for future economic stability and human dignity for the 1500 Canadian citizens who choose to live at Fort Chipewyan and in the surrounding area. Finally, it is the conclusion of this report that implementation of the proposal to construct a weir on the Rivière des Rochers should not be delayed beyond the winter of 1973.

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II PROPOSED ACTIONS WHICH MAY CAUSE ENVIRONMENTAL IMPACT

I EXISTING CHARACTERISTICS AND CONDITIONS OF THE ENVIRONMENT

INSTRUCTIONS

1- Identify all actions (located across the top of the matrix) that are part of the proposed project.
2- Under each of the proposed actions, place a slash at the intersection with each item on the side of the matrix if an impact is possible
3- Having completed the matrix, in the upper left-hand corner of each box with a slash, place a number from 1 to 9 which indicates the MAGNITUDE of the possible impact; 9 represents the greatest magnitude of impact and 1, the least, (no zeroes). Before each number place + if the impact would be beneficial. In the lower right-hand corner of the box place a number from 1 to 9 which indicates the IMPORTANCE of the possible impact (e. g. regional vs. local); 9 represents the greatest importance and 1, the least (no zeroes)
4- The text which accompanies the matrix should be a discussion of the significant impacts, those columns and rows with large numbers of boxes marked and individual boxes with the larger numbers.

SAMPLE MATRIX

	a	b	c	d	e
a		2/1			6/5
b		7/2	8/8	3/1	9/7

			A. DAM REMOVAL AND WEIR CONSTRUCTION									B. MODIFICATION OF REGIME							COMPUTATIONS
			a. Temporary construction camps	b. Quatre Fourches dam removal	c. Excavation rehabilitation	d. Surface excavation	e. Dams and impoundments	f. Blasting and drilling	g. Cut and fill			a. Modification of habitat	b. Alteration of ground cover	c. Alteration of ground water hydrology	d. Alteration of drainage and channel capacity	e. River control and flow modification			
A. PHYSICAL AND CHEMICAL CHARACTERISTICS	1. EARTH	a. Mineral resources	1/1	1/1	1/1	1/1	1/1	1/1	1/1			1/1	1/1	1/1	1/1	1/1			1/1
		b. Construction material	1/1	1/1	1/1	2/2	2/2	1/1	1/1			1/1	1/1	1/1	1/1	1/1			12/12
		c. Soils	1/1	1/1	1/1	2/1	1/1	1/1	1/1			2/2	1/1	1/1	1/1	1/1			12/11
		d. Land form	1/1	1/1	2/3	2/3	2/3	1/1	1/1			1/1	1/1	1/1	2/3	1/1			13/17
		e. Unique physical features	1/1	1/1	2/3	2/2	2/1	1/1	1/1			1/1	1/1	1/1	1/1	1/1			13/13
	2. WATER	a. Surface	/	5/5	1/1	1/1	1/1	1/1	2/1			1/1	1/1	9/9	9/9	9/9			36/35
		b. Underground	1/1	5/6	1/1	1/1	1/1	1/1	1/1			6/6	1/1	8/7	6/5	1/1			29/27
		c. Quality	1/1	6/5	1/1	2/1	1/1	1/1	2/1			5/4	6/4	5/4	5/4	1/1			30/23
		d. Temperature	1/1	1/1	1/1	1/1	1/1	1/1	1/1			1/1	1/1	1/1	1/1	1/1			1/1
		e. Recharge	1/1	7/6	1/1	1/1	1/1	1/1	1/1			9/9	1/1	9/9	9/9	9/9			42/41
		f. Snow, ice and permafrost	1/1	1/1	1/1	1/1	1/1	1/1	1/1			1/1	1/1	1/1	1/1	1/1			1/1
	3. PROCESSES	a. Floods	1/1	3/2	1/1	1/1	1/1	1/1	1/1			3/2	1/1	1/1	3/2	2/2			1.6/13
		b. Erosion	1/1	1/1	1/1	1/1	1/1	1/1	1/1			1/1	2/1	2/3	2/3	1/1			13/13
		c. Deposition and nutrient replacement	1/1	3/6	1/1	1/1	1/1	1/1	1/1			7/6	1/1	2/3	1/1	7/8			23/23
		d. Solution	1/1	1/1	1/1	1/1	1/1	1/1	1/1			4/3	1/1	1/1	1/1	2/4			13/14
		e. Sorption (ion exchange, complexing)	1/1	2/1	1/1	1/1	1/1	1/1	1/1			1/1	1/1	1/1	1/1	1/1			11/1
		f. Stability (slides, slumps)	1/1	1/1	1/1	1/1	1/1	1/1	1/1			2/2	1/1	2/3	2/1	1/1			1.3/13
B. BIOLOGICAL CONDITIONS	1. FLORA	a. Trees	1/1	1/1	2/1	2/1	2/1	1/1	2/1			9/9	1/1	7/8	1/1	2/1			2.6/23
		b. Shrubs	1/1	1/1	2/1	2/1	2/1	1/1	2/1			9/9	1/1	9/9	2/2	2/1			28/24
		c. Grass	1/1	1/1	1/1	1/1	1/1	1/1	1/1			9/9	9/9	9/9	2/2	2/1			32/3
		d. Microflora	1/1	1/1	1/1	1/1	1/1	1/1	1/1			7/5	6/4	1/1	1/1	1/1			19/16
		e. Aquatic plants	1/1	2/2	1/1	1/1	1/2	1/1	1/1			8/7	8/5	8/9	2/2	8/9			35/34
	2. FAUNA	a. Birds	1/1	2/2	1/1	1/1	1/1	1/1	1/1			6/5	7/4	1/1	1/1	1/1			20/17
		b. Land animals including reptiles	1/1	4/2	1/1	1/1	1/1	2/1	1/1			8/7	8/8	1/1	2/1	1/1			26/2.2
		c. Fish and shellfish	1/1	4/4	1/1	1/1	1/1	1/1	1/1			7/6	1/1	5/5	2/2	1/1			2.2/21
		d. Benthic organisms	1/1	3/2	1/1	1/1	1/1	1/1	1/1			1/1	1/1	5/6	1/1	1/1			15/14
		e. Insects	1/1	1/1	1/1	1/1	1/1	1/1	1/1			1/1	1/1	1/1	1/1	1/1			1/1
		f. Microfauna	1/1	1/1	1/1	1/1	1/1	1/1	1/1			5/2	1/1	1/1	1/1	1/1			13/11

C. CULTURAL FACTORS	1. LAND USE	a Wilderness and open spaces	2/2	2/1	2/1	2/1	1/	2/2	2/1			2/1	5/4	1/1	1/1	1/1			19/14
		b Wetlands	1/1	1/1	1/1	1/1	1/1	1/1	1/1			9/9	8/6	9/9	1/1	9/9			36/34
		c Grazing	/1	1/1	1/1	1/1	1/1	1/1	1/1			8/5	8/8	7/8	1/1	8/5			33/28
		d Residential	2/1	1/1	1/1	1/1	/1	1/1	1/1			2/1	1/1	1/1	2/1	1/1			13/1
		e Industrial	1/1	/1	1/1	2/1	1/1	1/1	1/1			1/1	1/1	1/1	2/1	1/1			12/1
		f Mining and quarrying	1/1	1/1	1/1	3/1	1/1	1/1	1/1			1/1	1/1	1/1	1/1	1/1			12/1
	2. RECREATION	a Hunting	1/	/1	1/1	/1		2/2	1/1			1/2	6/4	1/1	1/1	1/1			15/14
		b Fishing	1/1	1/1	1/1	2/1	1/1	/1	1/1			6/4	7/8	1/1	1/1	1/1			20/18
		c Boating	2/1	2/3	1/1	1/1	1/1	1/1	1/1			8/7	4/4	1/1	3/2	3/2			23/21
		d Bird watching	1/1	/1	2/1	1/1	1/1	1/1	1/1			8/6	6/3	1/1	1/1	1/1			23/21
	3. AESTHETICS AND HUMAN INTEREST	a Scenic views and vistas	2/2	3/2	3/2	2/3	/1	2/2	2/2			6/5	7/4	1/1	1/1	1/1			26/22
		b Wilderness qualities	3/2	3/2	3/2	2/3	/1	3/2	3/2			8/7	4/1	1/	2/	/1			28/21
		c Unique physical features	2/1		1/1	1/	1/	/1	1/1			9/9	7/6	/1	2/	1/1			23/21
		d Parks and reserves	1/		2/	/1	1/	1/1	1/1			9/9	9/9		/1	1/1			26/25
		e Rare and unique species or ecosystems	1/1	/1	/1		/1	/1	1/1			9/9	9/9	1/1	/1	1/1			23/23
	4. CULTURAL STATUS	a Cultural patterns (life style)	2/1	1/1		/1	1/1	/1	1/1			9/5	6/9	1/1		1/			22/20
		b Employment	4/2	4/2	4/2	4/3	1/1		1/1			9/9	9/9	1/1	2/3	2/3			35/31
		c Population density	/1	1/1	1/1	1/1		1/1	1/			4/2	1/1	/1	1/	1/			13/11
	5. MAN-MADE FACILITIES AND ACTIVITIES	a Structures (docks)	1/		1/	1/	1/	1/1	1/1			6/5	1/	/1	1/1	1/1			14/13
		b Transportation network (movement, acces)	/1	2/3	1/1	1/1	/1	1/1	1/1			7/4		/1	3/2	2/1			8/5
		c Channel dredging	/1	2/1	/1	1/1	8/6		1/1			/1	1/	/1	9/9	9/9			30/28
D. ECOLOGICAL RELATIONSHIPS SUCH AS		a Salinization of water resources	1/	7/4	/1	/1	/1	1/1	1/1			4/6	/1	3/4	/1				9/9
		b Eutrophication	/1	5/3			/1		1/			2/3	2/3	2/2	/1	/1			16/6
		c Food chains		3/2	/1	1/1	/1		/1			9/9	9/9	6/5		1/1			29/28
		d Salinization of surficial material	/1	/1	1/1	1/1	1/1	/1	1/			3/4	2/4	7/6	1/1	/1			18/9
		e Brush encroachment	1/1	2/	/1	/1	/1		1/1			9/9	9/9	5/9	2/	1/			28/30
		f Other																	
COMPUTATIONS			12/11	21/18	13/11	13/12	10/11	11/11	11/10			50/44	36/32	28/30	20/18	21/21			

DESIGNATION 1/1 INDICATES MINIMAL EFFECTS OR NO EVIDENCE FOR EFFECTS, EITHER POSITIVE OR NEGATIVE

RMATION MATRIX FOR ENVIRONMENTAL IMPACT ASSESSMENT

5

THE RESTORATION
of
WATER LEVELS
in the
PEACE-ATHABASCA DELTA

SUMMARY OF THE TECHNICAL REPORT OF THE PEACE-ATHABASCA ELTA PROJECT GROUP

ENVIRONMENT CONSERVATION
AUTHORITY

ALBERTA

[The following is a summary of the Peace-Athabasca Delta Study Group Technical Report. This summary was presented at the Edmonton hearings by Mr. Frank J. Forbes. The full report is available at the Environment Conservation Authority offices.]

Mr. Chairman, members of the board, ladies and gentlemen. I'd like to say that on behalf of the Project Group it's a pleasure to be here to help you review the recommendations of the delta report. I've been asked to summarize the conditions which led up to the establishment of the intergovernmental Task Force and the key findings from which we based the recommendations to build a weir.

First I'd like to comment briefly on the importance of Lake Athabasca and the delta. Lake Athabasca is one of our major inland lakes. It's an important part of the Mackenzie system. The Peace-Athabasca delta is one of our truly great renewable resources of Canada. It has an area of approximately 1,500 square miles, containing 10,000 buffalo of a herd of roughly 14,000 which inhabits Wood Buffalo National Park. It's an important part of Wood Buffalo National Park and is the only delta in the national park system. In the area there are some 45 species of mammals and over 200 species of birds, and it forms an important part of . . . . [Inaudible] From this you can begin to see and to describe this in technical terms. It contains a unique merging of aquatic and terrestrial ecosystems which should be preserved for all Canadians.

In the area, as Dr. Trost has already mentioned, we have the native community of Fort Chipewyan and these people over the years have been dependent upon the delta and Lake Athabasca for trapping and fishing.

What happened then to lead to the study which was set up in 1971? As you know, the Bennett Dam was completed in late 1967. In the following four years, during the filling of Williston Reservoir, the flood levels of Lake Athabasca were some two and a half feet below the long-term average. This meant that the water levels in the delta were lower and it led to changes in the habitat and wildlife populations of the delta. By 1970 these changes had reached the point where biologists were fearful that an ecological disaster was in the making. Because of this, Canada, Alberta and Saskatchewan set up an intergovernmental group which was interdisciplinary and intergovernmental, to assess the ramifications of the low water on Lake Athabasca.

The Project Group was asked to make recommendations as early as possible. Biologists at that time indicated that if the water levels were not restored at an early date the willows which had commenced growing in the sedge and grass meadows could become permanent. As Dr. Trost has already noted, some interim action was taken and this was in the form of a temporary rock-fill dam which was placed on the Quatre Fourches, which is the main channel connecting the delta lakes to Lake Athabasca. This was completed in the fall of 1971.

The findings and recommendations of the Project Group have been documented in the Summary Report, which was released in January of this year, and subsequently detailed in the Technical Report and appendices. In these reports we have attempted to integrate the various interdisciplinary and intergovernmental aspects.

Three time periods are important in assessing the conditions in the delta. First, what were the conditions before 1968? To answer this question we have to look at the record of lake levels for Lake Athabasca, and fortunately we have records dating back to 1930. These records then provide a good base for determining what were the average levels of Lake Athabasca and what was the regime, and as you know the levels rose from approximately 682 in the spring to an average peak level of just over 688 in July. This provides the flooding action necessary to maintain the habitat and the wildlife populations in the delta in balance.

The second period occurred during the filling of the Williston Reservoir— it's particular to that period and is unlikely to occur again. It did, however, provide an indication of what would happen to the delta if the low water levels persisted. As you know, in 1969 the levels reached only 85.8, 84.6 in 1970 and 86.5 in 1971.

The critical question remaining, however, is what will happen in the future to the delta if no remedial action is taken. With the dam in full operation the discharge will be in the order of 39,000 cfs. This will create a new regime on the Peace River, and we call this the modified regime. Under this regime average summer levels will be one foot lower than before 1968. Peak flood levels will be two feet lower than pre-1968 levels. This will have serious consequences for the delta. Some 300,000 acres of valuable sedge and grass meadows will eventually be replaced by shrub communities. Muskrat populations, which dropped from something in the order of 250,000 in the early 1960s to 17,000 by the spring of 1972, will continue to be lower than pre-1968. Waterfowl production will decline and the production of walleye, a valuable fish for the fishing industry of Lake Athabasca, could become sporadic.

Comments have already been made about the importance of trapping and fishing to the people of Fort Chipewyan. I noted that the delta is an important part of Wood Buffalo National Park, and under the policy of the Parks Department this is to be maintained in its natural state. The Project Group in assessing the problem then had to ask itself, first, what approach should be taken in restoring the water levels. Four options were open. Firstly, we could accept the modified regime and the changes which would occur in the delta. Secondly, we could take a look at the needs and requirements of the peopled area of the Park, of navigation, and try to come up with an intensive management program to meet this specific objective. Thirdly, we could think of putting in works to restore the water levels to what they were before 1968. Fourthly, we could put the water levels back and supplement this by additional works in specific areas of the delta to meet the needs of the people.

After considering the complex nature of the jurisdictions of the delta, the needs of the different groups involved, it was our opinion that the minimum action should be first to restore the water levels to what they were before 1968, and then to supplement this by specific works in specific areas of the delta to meet needs for trapping, fishing and so on. Having made that decision, the Project Group then looked at what kind of works was required. In the Summary Report and in the Technical Report we have documented the sites which were looked at and the different types of structures. We have also indicated the factors which we considered in evaluating the technical feasibility, by this I mean the capability of restoring water levels to the natural, the structural implications of the site and the structure, and the management feasibility of maintaining and operating the structure.

Another important consideration was the acceptability of the recommendation for the structure in turn because of the complex jurisdictions involved. Over this, then, we ruled out a controlled or regulated regime which would involve a gated structure. We felt that this would be extremely difficult to operate. It would require a fairly sophisticated and probably a very complicated government mechanism to bring the different jurisdictions together. Then we said, why not put this back to nature and let nature take over. Based on this we then recommended that the permanent weir be installed at the Riviere des Rochers site. This will in fact offset the effect of the reduced flows in the Peace River, and in the future levels will vary according to the run-off in the Peace.

In closing I might just add one comment which was made at Fort Chipewyan last week. In our reports we go to considerable pain to define the interrelation between water levels and the biology of the delta, and a trapper by the name of Sal Marten who has spent his life on the delta I thought summed it up very nicely. His comment was simply that, "In the delta water is the boss."

In closing I would like to draw your attention to the fact that the problem in Lake Athabasca and in the delta is one of the major environmental problems in Canada today. It's certainly worthy of your special consideration and deliberation, and I believe that if the delta were allowed to change the loss of it would truly be an ecological disaster. I thank you.

THE RESTORATION
of
WATER LEVELS
in the
PEACE - ATHABASCA DELTA

PUBLIC HEARINGS
FORT CHIPEWYAN

ENVIRONMENT CONSERVATION
AUTHORITY
ALBERTA

Interpreters:
Mr. Frank Ladouceur
Mr. Noel McKay

MR. W. A. FLOOK

Good afternoon, ladies and gentlemen. I'm very delighted to be here to welcome you all to our public hearings on the restoration of water levels in the Peace-Athabasca delta. I hope that you have all given your names to the young ladies at the entrance to the hall so that we know who you are, and that you have indicated to them whether you want to be supplied with any of the publications which will come out of these hearings.

Throughout the day we will be trying to hear what you have to say about the Peace-Athabasca delta. If you want to say something we would like it if you would come up to this young lady here to my right, give her your name and tell her that you want to be put on the program. However, if you don't feel like doing that just walk up to the side and when we see you standing I'm sure the Chairman will give you a chance to say what you wish to say.

And now, ladies and gentlemen, I'd like to introduce the Chairman of the Environment Conservation Authority, Dr. Walter Trost.

DR. W. R. TROST

Thank you very much, Bill and Frank. Ladies and gentlemen, we're all of us very glad to be here today. I'm going to make some introductory comments and Mr. Ladouceur and Mr. McKay will translate what I have to say and also all the things that other people who speak in English will have to say to you. At the same time those people who wish to speak in Cree will have their remarks translated into English by Mr. Ladouceur and Mr. McKay.

We are beginning hearings today on a subject that has been of interest and of importance to you for many years. This problem has also been of importance to the Governments of Alberta, Saskatchewan and Canada. We therefore have today with me representatives from those three governments. I would like to introduce these gentlemen to you. Beginning on my left, Mr. Ron Malis from the Government of Canada, then Mr. Stan Blackwell from the Government of Saskatchewan, Mr. Fred Durrant from the Government of Canada, Mr. Julian Kinisky from the Government of Alberta and Mr. Philip Dowling from the Government of Alberta.

We have come here to hear from you what you wish to have done with the delta now that the recent changes have happened to it. There have been people in the community who have been working on this problem now for some months. Early in May some of us met with representatives from Fort Chipewyan to discuss these problems. Shortly after that a committee was set up in Fort Chipewyan with representatives on it such as Chief Fred Marcel and Chief Gladue and other representatives from the communities. To help this committee other workers in the community were appointed and these included Sally Ward, Laura Campbell and Claudette Croteau from Edmonton. In addition, from among citizens in Fort Chipewyan, Simon Waquan, Jerry Adams, Ed Courtoreille and Lillian Mercredi worked with the committees. Two weeks ago a delegation representing the committee came to Edmonton to meet with us there and discuss these problems. These people, who included Alphonse Pische, Sal Marten and Lena Fraser, made clear to us that you people have points of view to express. We want to hear today all of the views and opinions you do have about the delta now and for the future.

There has been work done by the three governments in the past two or three years to see what should happen to the delta. From this work it was suggested that an underwater dam be built at Little Rapids on the Riviere des Rochers. Mr. Frank Forbes will describe this work to you. In addition Dr. Smith has described what he thinks may be the results of building that underwater dam. The paper that Dr. Smith has written has also been translated into Cree. A shorter statement of what the hearings are about has also been translated into Cree. Both of these writings are available at the back of the room if you want to have them. Dr. Smith will also talk to you after Mr. Forbes.

I would now like to call on Mr. Forbes to address you.

[Mr. Forbes here summarized the Peace-Athabasca Delta Project Group Technical Report, which appears on page 43 of these proceedings.]

Our next speaker is Dr. Smith, who will summarize the paper he has written for these hearings. Dr. Smith has been one of the foremost people in Alberta to be concerned about and aware of the problems that were developing in the delta, and he has been doing this now for many years. Dr. Smith is also an ex-colleague of my own and I take a special pleasure in asking Dr. Smith to talk to you.

[Dr. Smith here summarized his report, which appears on page 1 of these proceedings.]

Thanks very much, Stu. I'd like to now call on Mr. Pat Mercredi to address us and perhaps introduce the chiefs.

MR. P. MERCREDI

First of all I'd like to ask Chief Gladue and Chief Marcel to step up and welcome the delegates.

CHIEF F. MARCEL

Thank you, Mr. Chairman. On behalf of the Cree and Chip Band, welcome to the delegates that came to visit us from the Governments of Canada, Alberta and Saskatchewan. What happened here is these few people came to make a speech, but there's still lots more to hear and lots of questions have to be asked. We, the people in Fort Chip, are not fully aware of what all has been done, even with the Delta Project Group that has been here for so long. Many of us Cree Indians and lots of others, we don't really understand exactly what all has been done and what they will in the future be looking for. Therefore, now, between ourselves, the Cree and Chip Band, we worked together and we have a brief to present to the group. We ask our Band manager, Pat Mercredi, to present our brief. We need any help; we also ask Simon Waquan—he's one of our Band members but he is out at Edmonton working with the government. And also, since I say we don't understand many things, we want to make sure before we say what we think is right to say and we also hired another man to come and help us. It's Mr. Moncrieff, and he is welcome to say whatever he wants at this time. Thank you.

CHIEF A. GLADUE

Thank you, Mr. Chairman, as you've given me a chance to say a few words. Ladies and gentlemen, and people of government. I welcome you in this community of Fort Chipewyan, and also other delegations that are here. Like Mr. Marcel has just said, the Cree and Chipewyan bands have combined together, and this organization here for Cree and Chipewyan bands, also with the Fort Chipewyan community as a whole, will live in this Fort Chipewyan all our lives. I speak on behalf of the whole community of Fort Chip. There's not too much I can say right now, but I understand what these people, government officials, are here for. I understand that they want to hear our comments, what we want for this community for the near future and what happened in the past— this is what I think we are here for.

Like Mr. Marcel has just mentioned to you, Mr. Pat Mercredi, the Cree and Chipewyan Band administrator, is going to present a brief on behalf of the Cree and Chipewyan Band, and also Simon Waquan, on behalf of other Cree Band members, and also Mr. Moncrieff, also with the Cree and Chipewyan Band, is here.

MR. P. MERCREDI

I'm reading this brief on behalf of the two chiefs of the Cree and Chipewyan Band and members, to the governments that are sitting with us today. We have been made aware that the Province of Alberta through its Environment Conservation Authority proposed to hold public hearings to explore the issues in September 1973. We understand that their purpose is to obtain information on the question of building a dam on Riviere des Rochers which is thought capable of restoring the historic rise and flow of Lake Athabasca. Most of the leaders of the Crees, Chipewyans and Metis living in our vicinity have been made aware of the importance of the levels of Lake Athabasca in terms of the National Park and the Chipewyan Reserve, provincial and outside of the Park.

We are aware that any position we take as a group together may be very influential. We must then be careful in our deliberations and studies to ensure the correctness of our position and opinions, as the structure will be permanent. None of us in Fort Chipewyan has technical experience or knowledge with which to judge the cause/effect relationship of the controlling of the water by this dam. Thus it is pointless to enter into deft discussion on it.

Dr. Smith has already mentioned that Fort Chipewyan is an old community, and that the 1,600 Canadians that live here are trying in many ways to make it a better place to live and work. We know that the cities are getting bigger and more crowded and some places, like Fort Chipewyan, may be more important than they seem today. We know that the Government of Alberta is trying to do things to spread the jobs and opportunities all over the province, and we support this, and we hope to make it happen here also. We in Fort Chipewyan look forward to participating in the good things that we hope will come from the tar sands development. And perhaps it will not be necessary for many of our people to leave Fort Chipewyan to do this. Perhaps some kind of industry can be established here which will provide good jobs for our people. We are watching closely the efforts being made to establish a granite quarry here and would like more information on that. This will help the future of our people, but we must look at today's need too.

The Cree and Chipewyan Band works together under one administration. We always tried to work on behalf of the whole community on our economic, education, recreation and other projects, not just for our members. This is important because many times different groups in the community don't agree on the way to do things. This holds the community back in many areas.

Now I will speak on the area of the water control measures proposed by the Delta Project. Our Band Council has tried to learn as much as we can about a dam which may be built on Riviere des Rochers. Information which has been made available in Cree and English has helped, but we must tell you that we are not sure what will happen. Today we think it would be better for you to ask questions about the dam. Maybe we can help you in this way. If the people who might have the answers are not here today or do not understand your questions we'll find out and let you know what they think. The government people say that a dam will make things the way they always were on the delta. This is good. But many people who remember some low water years wish the dam could make the delta even better.

We know times are changing. Some of the younger people aren't as interested in trapping, fishing and hunting as the older ones, but by helping the trappers' association and the fishermen's co-op this matter may change, for then we'll have the good marketing and management and training which will make this happen. We want to tell you that trapping, fishing and hunting still are very important to our people here. If water levels were to stay low, hurting the muskrat and the fish and drying up the hunting streams, this could hurt very badly the people and the community of Fort Chipewyan. And tourism possibilities, as Mr. Smith has mentioned, will be less.

The main thing we wish to say about the dam is that we are a bit worried. We think it might be good, but we are not sure. The Athabasca Cree and Chipewyan Band would like letters from Honorable Mr. Davis and Honorable Mr. Yurko telling us exactly what they think the dam will do, what problems it might create and what other control measures might be necessary in the future, before we commit ourselves. With these letters the Athabasca Cree and Chipewyan Band can talk more about the dam with its members and consult with the Indian Association of Alberta and other people. After that we can decide what we think. If a dam is built we hope that every opportunity will be given to the people of the area for work. Also, still about the water, the Band wishes to say that they will be watching closely for any signs of pollution which might again be caused by development at Fort McMurray. Finally, the Cree and Chipewyan Band wishes to express its general support for the things said by other groups and individuals here today.

This concludes the first part of the brief and now I'll read a brief that I myself as Tribal Administrator am presenting on behalf of the Athabasca Cree and Chipewyan Band and other members of this community. I have reviewed recommendations of the Peace-Athabasca Delta Project and on paper see that I can say that the Council of the Cree and Chipewyan Band agrees with such things as: a high priority being assigned to the conservation of the Peace-Athabasca delta; programs to aid fishermen and trappers; expansion of consultation with local people. Other suggestions following the report are: the possibility of a granite quarry near Fort Chipewyan; a fish processing and freezing plant; log home and building construction program to meet the weather conditions—and definitely I shall add that if any officials wish to come to visit some of the homes, the new homes that are being built, and stay the night there, they'll know what I mean; extension of water and sewer systems; utilization of existing resources as mentioned by Dr. Smith. Tourism based in the delta, the Canadian Shield, the dunes, he intended to be the focus of the development of the area. The local and regional goals mentioned in the Technical Report, pages 97 and 98, are things of importance also.

If some and eventually all of the above developments and goals could be fairly well achieved Fort Chipewyan would be well on the way to becoming an independent, successful, vigorous community. The Band will do everything in its power to help; however, the Band like other community organizations has difficulty in working effectively with many government departments in many different cities. Communication is a real problem. However, the Band will continue to do everything it can and we are sure that sound proposals will be supported whenever possible by the Department of Indian Affairs and Northern Development and other governments responsible.

I will now mention our consultant, Mr. Hugh Moncrieff, who was involved in socio-economic research on the Peace-Athabasca Delta Project and has been assisting the Band Council to understand and prepare for these hearings. He will also be working for the Band during the coming year on matters pertaining to administration, planning and economic development. He has been retained because the Band feels it could use some help in its relationship with many government departments and programs as well as with industry. He will make brief comments. In conclusion a written follow-up on the presentation will go to the Environment Conservation Authority after the hearing.

MR. H. MONCRIEFF

Mr. Chairman, ladies and gentlemen. I had the privilege of working along with many members of the Peace-Athabasca Delta Project during the period they were here, and I did appreciate that and I think it is wonderful that the hearings are being held here in this way. Based on my experience here in Fort Chipewyan and in similar communities, Canadian communities, and based upon my position as a special consultant to the Athabasca Cree and Chipewyan Band and based on my knowledge of the problems and the objectives of other organizations in this community, I believe that my comments will be quite appropriate and relevant. I think I understand the Environment Conservation Authority's objectives and their concern as stated by the Chairman in an article I read this morning—Dr. Trost and his concern for people.

I want to make five points. Firstly, this is an extremely difficult place to live. The people of Fort Chipewyan as individuals probably have more contact with government in a week than many people who live in Edmonton have in a year. This complicates things. I think that it is clear that much greater effort must be made between the federal government and the provincial government on their programs as they affect communities like Fort Chipewyan.

Fort Chipewyan has many goals—jobs, training, recreation. I believe that many of these goals can be achieved, but what I would like to say to the delegates here today is that the goals are clear to the people here. They can see the things they want, but it is extremely difficult to reach out and achieve those goals. The various organizations get bogged down in the problems of trying to reach those goals and it produces all kinds of problems in the community and leads to frustration many times. The failures we see and the financial difficulty of major developments such as sawmills, fisheries and other kinds of organizations such as the fishermen's co-op, could be largely avoided with better planning and better management. I would just say that the kind of situation resulting from too many more years of difficulty in a community such as Fort Chipewyan working with the government, could make welfare a very real alternative in this community. If the present situation facing communities such as Fort Chipewyan were to be extended for eight or ten years, many real human and economic opportunities would be lost, perhaps forever.

On behalf of the Athabasca Cree and Chip Band I commend your interest in this community and implore you to consider strongly that there is a need for improvement in the long-term effectiveness of the relationship to government in all its forms in Fort Chipewyan and similar communities, and I say this in a very constructive way, not in a critical way. Thank you very much.

MR. S. WAQUAN

Mr. Chairman, members of the Environment Conservation Authority, the Government of Canada and the Government of Saskatchewan. I will first introduce myself to those that don't know me. My name is Simon Waquan. I am here representing the Indian Association of Alberta on the invitation of the Athabasca Cree and Chipewyan Band.

I want to say first of all that I am fully aware of the concern that the Fort Chip people have presented to you this afternoon. However, there seem to be two items that are still vague in my mind, and if it concurs with the Cree and Chip Band members, I would like to present this to you. Mr. Forbes mentioned that the water levels of the Peace-Athabasca delta dropped in the year 1968 and hoped that, with the new dam, water levels would be brought back within a couple of years. But there seems to be a big gap from 1968 perhaps to 1975 or 1976. What has the government done to assist the people of this community? What programs have been brought by the government to pick up the slack? What compensation has been given to the trappers who were at one time making $1,000 for the fall hunt, who are now making $200 a month? It seems that the only alternative that the government has seen fit to give to the Indian people and the other people of the community is welfare, which seems very very inadequate, to pick up the slack. It's totally unacceptable compensation to the people for the loss that they have received from the effects of the Bennett Dam.

The other highlight of the message that the people were bringing across to you which perhaps wasn't brought out clear enough, was that the government—both levels of government, the federal and the provincial—has always had much interest in the animals, rivers, waters of this country, but how much emphasis have they placed on the people? This is the question I ask today: what is being done for the people? What is being planned for the people? What can they look forward to a few years down the road? What happens if the water level is brought back again two years from now, and yet the people are living on welfare and starving in the meantime? What training programs, what other programs have both levels of government come in here with to pick up the slack from what we have lost?

I was quite interested in the comment made by Mr. Forbes. He mentioned the availability of other forms of livelihood such as tourism, fishing and trapping. It's fine to say that these are good things, but what is being given to assist the people in acquiring these things? It's fine to stand up here and give you all the problems that are resulting from the Bennett Dam, but what action is being taken to assist the people of Fort Chipewyan in getting something in return for what they have lost?

Before I close off I would just like to make one closing comment. Since I've worked with the Indian Association of Alberta I have become very very interested in treaty rights. One of the things that always seems to come to mind when we discuss the treaties is that there is a version there that says, "As long as the sun shines, the grass grows and the rivers flow, our treaties will be abided by." I get a little suspicious when they mention a dam and the water levels going down. Perhaps maybe by building the dam they're attempting to stop the waters from flowing and perhaps by drying up our soils the grass is not going to grow, so we're two points closer to losing our treaty rights. The next item that we have to be concerned about is that the sun doesn't stop shining. Thank you.

[COFFEE BREAK]

DR. W. R. TROST

Ladies and gentlemen, our next speaker is Mrs. Lillian Mercredi, speaking on behalf of the Women's Voice of Fort Chipewyan. While Mrs. Mercredi is coming to the front I would like to list three questions that we would like to put to the chiefs and to Mr. Mercredi in respect of the submissions we had before the coffee break. First of all, if the delta and the lake systems are restored to their former conditions, will all of the people in Fort Chipewyan have a reasonable livelihood? Secondly, if there is need for additional employment after the delta and the lake are restored, if they are, will that additional employment come from developments such as those at Fort McMurray and if so what effect would that have on Fort Chipewyan? If might be that other kinds of employment than those now at Fort Chipewyan might also be thought of if additional jobs are necessary. Thirdly, the chiefs had indicated that there would be a place for further discussions about the proposed dam and we would like to know how these discussions might best go forward from their point of view. We would be very pleased if you would think about these three things some more and give us further advice on them. Thank you very much.

[Refer to page 83 of these proceedings for Mr. Mercredi's answers to the questions posed above.]

If I can now ask Mrs. Lillian Mercredi to speak to us for the Women's Voice of Fort Chipewyan.

MRS. L. MERCREDI

Thank you, Mr. Chairman. Good afternoon, ladies and gentlemen. I represent the Women's Voice of Fort Chipewyan to the Environment Conservation Authority. Although we, the Women's Voice of Fort Chipewyan, realize that the primary purpose of these hearings is to discuss the effect of a government proposed weir at Little Rapids, we feel that the concerns we will express are of great importance to our community. We feel that these hearings are an opportunity for us to voice these concerns and hope that the government will take action in our requests.

The concerns which the Women's Voice of Fort Chipewyan would like to bring to government attention are as follows: (1) Education, (2) Medical services, (3) Cost of living, (4) Transportation, (5) Recreation for Youth, (6) Public services, and (7) Anticipated community projects.

(1) Education.

(A) High school. We strongly recommend a high school. Presently students wishing to attend high school must leave the community for Fort Smith, Fort McMurray or Edmonton. This means that our 14-year-olds are forced to leave their families and familiar surroundings. As a result there is an extremely high drop-out rate which in turn contributes to high unemployment. Furthermore, a high school would benefit the life of the community by providing activities related to school.

(B) Adult education. We would like the following courses offered: (1) consumer buying (budgeting), (2) upgrading, (3) leadership courses, (4) basic cooking—on to commercial cooking, (5) sewing classes—local women teaching beading, parka making, quilt work, (6) arts and crafts, and (7) hairdressing and barbering. Trailers were brought into the community to provide facilities for adult education through the "New Start Program". The program is no longer operating and the facilities are now in the hands of the provincial government. Since there is a strong need and interest in adult education we recommend that these trailers be made available for that purpose. If this occurs we see a good possibility of setting up a day-care center for local women which would also serve as training in child care.

(C) There should be a full-scale hot lunch program at both schools.

(2) Medical Services.

(A) A hospital and a doctor. There is a definite need for a hospital and a doctor in a community of this size. Presently people are hospitalized in Fort Smith, Fort McMurray, or Edmonton. This naturally presents difficulty in giving immediate medical attention in emergencies.

(B) Nursing home. We feel that it is a pity that old people who are born and raised here have to leave when they become too old to care for themselves. A nursing home would also provide for more people that are being neglected. The home would provide employment.

(3) Cost of Living.

(A) Because we have no access to a road food is either flown in or brought in by barge. Needless to say this adds considerably to the cost of groceries. Buffalo meat would certainly help combat meat prices.

(B) Power rates here are 13¢ to 14¢ per kilowatt hour as compared to 2¢ to 3¢ per kilowatt hour in Edmonton. The cost of fuel is $17.55 a barrel (45 gallons). An average sized family may use five or six barrels a month during winter months. This means it costs the average family $87.75 a month for fuel.

(C) Because the only entertainment we have in this town is a theatre and pool room we would like to see TV provided.

(4) Transportation.

Daily plane service to the south and weekly flights to Fort Smith would be a service greatly appreciated by residents. An all-weather road would particularly eliminate the high cost of living.

(5) Youth.

There is a lack of organized recreation for the youth of this community. A sports center with a recreation director would keep the kids off the street and out of trouble.

(6) Public Services.

(A) Public baths and showers. Because most homes in the community do not have running water we would like to see a building with bathing and showering facilities. We would like money to be made available in the form of a loan for anyone interested in establishing an adjoining laundromat.

(B) Waterworks. Of great necessity are waterworks for all homes in the near future.

(C) A thorough inspection of Mah's Hall—healthwise. We request that there be an inspection of Mah's Hall in regards to health regulations and age restrictions for the show hall and pool room.

(D) A bank. Some of the people have such a time cashing their cheques around here. We would like the possibility of a Treasury Branch in Fort Chipewyan looked into.

(7) Anticipated Projects.

(A) Handicraft center. A grant to help build a small center downtown would increase the sales of goods, provide a place for the women to work without interruption and would provide employment for a sales clerk.

(B) Museum. Because of Fort Chipewyan's historical significance we would like help in starting up a museum.

QUESTIONING BY THE PANEL

DR. W. R. TROST

Would you tell us who the Women's Voice of Fort Chipewyan consists of?

MRS. L. MERCREDI

It includes all the ladies—Cree, Chip, Metis and white.

DR. W. R. TROST

You've made a very sensible submission, it seems to me. Has there been a past history in an attempt to get a high school for the Fort?

MRS. L. MERCREDI

Yes, there has. We've been trying to get one here, but we've just never got it yet.

DR. W. R. TROST

How many children would be able to go to that high school, of the right age and so on?

MRS. L. MERCREDI

Our next speaker, that's Mrs. Tuccaro, is speaking on education. She's going to answer that question. Would you like to come up now, Theresa?

MRS. T. TUCCARO

Thank you, Mr. Chairman. Ladies and gentlemen. First of all, I'll comment on what Mrs. Mercredi has just mentioned. Drop-out rates in 1972-73 were 18 students in Grade 9; in 1973-74, 31 students in Grade 9, 17 students in Grade 10. So the drop-out rate would be 75 percent both in 1971-72 and 1972-73.

DR. W. R. TROST

Could we just have one or two more questions from Mrs. Mercredi? You mentioned a road. Have you a route for the road? Where do you want it to come in from?

MRS. L. MERCREDI

Well, it really doesn't matter to the women, I guess, as long as there is a road of some kind out of Chip.

DR. W. R. TROST

And is there general agreement in the community on the need for a road?

MRS. L. MERCREDI

Yes, there is.

DR. W. R. TROST

Now, another interesting suggestion you had was a museum, because of the long history of Fort Chipewyan. Is there any kind of a beginning to a museum yet in Fort Chip?

MRS. L. MERCREDI

Lena Fraser, please?

MRS. L. FRASER

Since I have seen the museum in Fort Smith I have been very interested. I think Fort Chipewyan has a lot of old historic antiques that should be kept in Fort Chip instead of people from Fort Smith coming here to ask us for our old antiques. I don't see why the people of Fort Chip can't have a museum of their own. From what I hear from the women of the Women's Voice of Fort Chip there's a lot to be put into this museum. We talked about it, everybody is interested in it and I think we can get this museum through an LIP grant.

But the thing is we don't know how to go about getting an LIP grant. We sure would like to inquire about a grant into this museum, and if we had a museum maybe the handicraft center would come into this too. A museum would need a building and a lot and if a person that's sitting up here right now would talk to us about where we would be able to get an LIP grant we would really appreciate it.

DR. W. R. TROST

Thank you very much.

MRS. L. MERCREDI

I think Mrs. Inglis would like to say a few words about the road.

MRS. T. INGLIS

The road, as you know, is non-existent. We don't have any access to the outside. And as you're well aware you have had some difficulty in getting into town today. I don't imagine the long route that we're planning would be any asset to you today but the fact remains that a road to the thirtieth base line through Alberta would give us an all-weather road and would place us in a position where we could then connect in the future to Fort Vermilion and out to the centers where we get the things we import to live on—our food and other things. These things are very expensive to bring in by air, and often enough the airplanes don't come in.

The obvious way, of course, is an all-weather road which could connect us with the Fort Smith road, but also lead us to Fort Vermilion and to the outside where our stuff does come in. We do want access to the outside and the outside means Edmonton, of course, and large centers where the retailers and wholesalers exist. Also we do need closer relationship to Fort Smith as regards air service. We used to at one time have a weekly air service to and from Fort Smith, and this is non-existent now. In the winter it's no problem but there are long summer months, and fall and spring, where we don't have access other than by charter. But primarily we are interested in an all-weather road and I think everyone agrees that the all-weather road would take us to the thirtieth base line, on to that 77 miles that has been slashed and surveyed and eventually into Fort Vermilion and into Edmonton. Of course there again you would have a cutoff to Fort McMurray, and this is a feasible aspect of the road. Thank you.

DR. W. R. TROST

Thank you very much. Would you like to call on anyone else to elaborate on any of the points in your submission, Mrs. Mercredi?

MRS. L. MERCREDI

The lady who was to talk on the cost of living cannot come at this time. That's about it for me.

DR. W. R. TROST

Thanks very much.

Our next submission is from Mrs. Theresa Tuccaro.

MRS. T. TUCCARO

Thank you, Mr. Chairman. Ladies and gentlemen, government officials. This is the Kiwitinok Association brief to the Peace-Athabasca delta hearings.

The Kiwitinok Association became a registered society in February 1972, after two years of meetings in this settlement. The main aims of this society are (a) to stimulate interest in and appreciation of the needs and problems of the native people in Fort Chipewyan, (b) to initiate training programs, and (c) to organize and develop comprehensive socio-economic enterprises relevant to the native people in Fort Chipewyan. When I mention native people that covers the treaties and the Metis of this community.

These aims have been communicated to all levels of government, both federal and provincial. At present we have 104 paid-up members. A few months ago we received our first concrete assistance, namely a grant of almost $9,000 from the District Indian Affairs Office. With this money we hope to commence some training programs commencing in October. These programs will take place in the Bishop Piche School.

As a society we have taken a really good look at your poster which states, "We need your help to save your way of life." Do you government people realize what our way of life is today and what it has been for a long time? A life without the ordinary amenities which you take for granted. We need your help to help us--not to save our way of life, but to help save our pride and dignity. Surely we as people are important and when the governments are considering the construction of a dam they might also consider life's ordinary amenities, such as running water and sewage in the native homes, television facilities for educational and recreational reasons, an all-weather road to lower freight costs and a high school so that we can keep our children in this community.

We do support the idea of a dam so that our men can continue to make a living and earn an income by fishing, hunting and trapping as it was done in the past. Thank you.

DR. W. R. TROST

Thank you very much.

Our next submission is from Mr. Frank Ladouceur on behalf of the Athabasca Fish Co-op.

MR. F. LADOUCEUR

Thank you, Mr. Chairman, and I don't know how to thank government officials who attend our hearing today, and also all the people who attend the meetings. Ladies and gentlemen. We have a submission to the government from Athabasca Fish Co-op.

The fishermen of the Athabasca Fish Co-operative have discussed the proposed dam on the Rochers River at some length. While it is impossible for anyone to accurately forecast all the changes which may result from this dam, we are generally in agreement that some attempt like this is a necessary one to counteract the results of water restriction on the other end of the Peace River.

Some of the possible advantages which we see for our industry are: (1) It will help maintain the lake levels of Lake Athabasca at more satisfactory levels. (2) The flooding of the delta should be assured so that good spawning conditions in the critical delta area will be maintained. (3) Better delta water levels would help to maintain the good commercial population of fish in these lakes so that sustained yields could be harvested.

Some of the possible disadvantages are: (1) Much longer haul if we have to take our fish to Fort Fitzgerald. (2) Some spring seasons there may be ice jams backing up to the lake and hindering the clearing of the ice from the lake for early fishing. (3) A watch will have to be kept on the Quatre Fourches and Coupe channels so that restrictions in the Rochers don't divert the water through these delta channels, thus enlarging them so they have to be restricted. This would hinder navigation further.

Now in regard to other problem areas in fishing, hunting and trapping we would make the following suggestions: (1) The fisherman should have an outfit license which covers his boat and nets so he doesn't have to buy a $15 license for a number of helpers over the summer. (2) The establishment of two zones in Lake Athabasca hinders the fishermen in following and catching the fish. (3) Much area of the west end of Lake Athabasca is reserved for domestic area. Much of this area is not used for domestic use and the fishing in that area should be harvested. (4) There is a large potential of commercial limit within the Park boundaries. These fish should be harvested and used for food before they die. (5) Sportsmen limits on big game and birds hinder the local people from obtaining food for themselves in the traditional manner of hunting. We need special regulations for food hunting in the Fort Chipewyan area. (6) In addition to this, the cost of licenses for hunting comes too high. A general trappers' license should cover all big game and birds. Someone that isn't trapping should have one special license covering big game and birds, with adequate quotas so that he can obtain his fall meat.

QUESTIONING BY THE PANEL

MR. E. F. DURRANT

Frank, you mentioned that the weir or the dam on the Riviere des Rochers would make it necessary to take a longer trip, if you have to take your fish to Fort Fitzgerald. I was wondering, where do you take your fish now?

MR. F. LADOUCEUR

We're taking our fish to . . . well, until about three days ago here, the last trip was made to Carlson's, but on account of this bad weather we'll have to take our fish to Fitzgerald. We ship our fish to Hay River.

DR. W. R. TROST

There has been some talk about a fish processing plant in an earlier submission. How do you feel and how does the fishing co-operative feel about fish processing plants for your product?

MR. F. LADOUCEUR

That would be a great thing for this community here because there would be a lot of people employed. Just for a good example, if we had a processing plant here we wouldn't have lost 26,000 pounds of fish culled in Hay River for a long trip back from the Willows to Hay River, which is about 400 miles.

DR. W. R. TROST

Do you harvest enough fish to support a processing plant here in Fort Chip?

MR. F. LADOUCEUR

We should, providing every fish that's caught in the net is in good condition and it won't be culled, but if the fish is not too good, well, he's got to be culled right at the plant. The amount of money we've been losing for the last two years on account of culls is no good to the fish co-op, which is going deeper in the hole all the time, and so are the fishermen.

DR. W. R. TROST

Has the fishing been affected much in the last few years?

MR. F. LADOUCEUR

No, it hasn't. The fishing has been just as good as it ever was.

DR. W. R. TROST

And that's for all the different kinds of fish in the lake?

MR. F. LADOUCEUR

That's right. Any kind of fish you want. But here in the shallow water we don't get the trout, that's the only species of fish we don't have, but we have pickerel, jacks, whites.

DR. W. R. TROST

Is the price of fish going up to you people the way the prices of other foods are rising now?

MR. F. LADOUCEUR

Not a bit. We still got the standard price from last year, the same—it's no different from last year, which I think is 51¢ or 52¢ a pound for pickerel—that's dressed, you know, headed and dressed.

DR. W. R. TROST

So you're selling the fish at what is a fixed price, in essence?

MR. F. LADOUCEUR

Right. Well, it's controlled under the Fresh Water Fish Marketing Co-operation.

DR. W. R. TROST

Do you know whether the price of the fish has changed when people buy it?

MR. F. LADOUCEUR

Well, we heard some of it but the Fresh Water Fish never contacted us. Of course there's quite a bit of expense to go through before the fishermen clear a little bit of money on the fish. You see, there's different prices on whitefish—there's about four different prices, different sizes, different quality.

DR. W. R. TROST

How many people in Fort Chip are fishing actively for a livelihood?

MR. F. LADOUCEUR

There's six big boats, it would be about 30-odd people fishing there, I think, including the hired men and plus some dock workers.

DR. W. R. TROST

If there were a fish processing plant do you think more people could fish?

MR. F. LADOUCEUR

I think so. I think more people could be fishing. We have talked to some government people about getting the Park open for fishing so some people from the Park would make a good living at it, because we understand there's an awful price for goldeyes even, outside.

DR. W. R. TROST

How far up the lake do your people go fishing?

MR. F. LADOUCEUR

About 50-60 miles, right to the boundary.

DR. W. R. TROST

What kind of boats do you use?

MR. F. LADOUCEUR

We have 40-footers, steel boats, with different types of motors, some up to 160-165 horse.

DR. W. R. TROST

So there'll be a crew of how many to such a boat?

MR. F. LADOUCEUR

Well, you can have a crew of four if you want, but we generally have three.

DR. W. R. TROST

And is your fishing season at certain particular times of the year?

MR. F. LADOUCEUR

The season's open right after the ice is gone on Lake Athabasca, this portion, here and there. If you want you can start fishing pickerel, but I don't really know when the seasons close—it will be about the middle of October, I think. I'm not too sure of that.

DR. W. R. TROST

Will the fishermen work at other things at other times of the year?

MR. F. LADOUCEUR

Oh yes, some go to work, some go trapping.

DR. W. R. TROST

Do you also fish through the ice as part of the fishing operation?

MR. F. LADOUCEUR

Yes, we do. I've been fishing all my life as a matter of fact, but commercially last year, we fished.

DR. W. R. TROST

Thanks very much, Frank.

MR. E. F. DURRANT

If you were taking fish to Fort Fitzgerald, the shorter route that you take now, would that be through the Coupe channel?

MR. F. LADOUCEUR

We have two ways of taking our fish down to Fitzgerald--either they go down to Fitzgerald or to Carlson's. We can make about a trip a day, or a load of fish, to Carlson's and load the trucks, take it to Hay River, the packer comes back and loads her and it goes right back. In 24 hours I think he should be able to make one trip, providing there's enough fish at the plant and, of course, you have to think about windstorms. Sometimes it's just impossible to lift the nets on account of storms.

DR. W. R. TROST

Thanks very much, Frank.

Our next submission is from Miss Margaret Vermillion, on behalf of the Bishop Piche Students' Union. Miss Margaret Vermillion, please.

MISS M. VERMILLION

Honorable members, ladies and gentlemen. We the students of Bishop Piche School would like to visit any construction projects in the delta area. Our reasons are as follows. We would like to talk to the people occupying various positions, such as welders, secretaries, sales personnel, engineers and so forth. This would permit us to see first-hand such occupations, enabling us to increase the number of different types of jobs available to us in the near future. Grade 9 has been interested in the hearings and future proposals for Fort Chipewyan. We are the people who will be living here in the future and anything which you decide upon will have a direct effect upon us. I would like to give to you a number of essays which have been written by the Grade 9 students. These are rough drafts only, but we feel worthy of your consideration. Thank you.

DR. W. R. TROST

It's very nice to receive these. Thanks very much, Miss Vermillion. We'll have the briefs from the other students typed and they'll appear in the proceedings of these hearings along with the other submissions, and we'll look them over during suppertime and we may have time to read some of them into the record later.

[Refer to page 85 of these proceedings for excerpts of these letters which were read into the record, and to page 366 of these proceedings for full typed copies of them.]

If I can now call on Mr. Robert Siddall, who has a private submission.

MR. R. SIDDALL

Members of the board, ladies and gentlemen. I am a teacher at Bishop Piche School and what I'm going to talk about is restricted just to asking or suggesting that the Fort Chipewyan area receive a television outlet. I have noticed that it's been mentioned in a number of other people's submissions that we receive the television signalling in the area. I would just like to explain some of my reasons for having this service.

As a teacher, every day I come into contact with different people, children, and we have trouble often in explaining to the children such things as farming, or current events—even who Nixon is or who our Prime Minister is. So often the kids in the outside areas see these people daily, weekly, in various television programs, and when our kids go to the outside to high school—or if they don't go to high school, if they just go to the outside—they don't have the background which is available to kids in the outside, which is achieved through television.

While I was at University we heard over and over again that television has either good effects on children or bad effects, but whether it's good or bad I think we as a town could use television. Now, towns further north, Fort Smith and all of these other places which we keep hearing about, had canned television for a number of years and now they're being hooked up to the Anik satellite. If we were hooked up to the Anik satellite we still would not be part of Alberta—we'd be part of Vancouver, and Vancouver is a long way away. The reason for that is, and I might be mistaken, the television signals for the Anik satellite come from Vancouver. I might be mistaken, but when I was watching it in Fort Smith last year they were advertising for a big sale at one of the Vancouver department stores. All the people in the room were thinking this is a great deal, and what good is that going to do to the people of Fort Chip—to go to a sale in Vancouver? Or else, talking about some of the cultural things which are available to the people of Vancouver. Fort Chip is a long way from Vancouver.

Thank you very much.

DR. W. R. TROST

Thank you very much.

Our next submission is from Mr. Jim Carbery, the chairman of the local advisory board.

MR. J. CARBERY

Board members, ladies and gentlemen. I hadn't intended to speak at all, but in view of some of the things that have been said I felt that I should bring to the attention of the board the fact that every time the local advisory board approaches the provincial government as regards roads, or a high school, or running water, or sewage, or a bank, we get the same answer every time. The answer is usually, "There's not enough people here to provide a big enough tax base." So in some ways we seem to be in a vicious circle.

The people here today have shown you that their wants are basically the same as any other community. We all want an all-weather road, but last time we asked for it the government said, "Well, what are you going to haul out of here—what's going to come in here?" We want a high school. "Well, how many kids have you got? Oh well, fifty is not enough." We root for TV and the federal government told us even that Fort Chipewyan hadn't been identified and yet we're sitting here with 1,500 people. They have TV in Uranium City; they have TV in McMurray; they have TV in Smith. And we sit in the middle and we get just sweet nothing.

The running water and sewage is quite a problem. I'm associated with education. I came in here five years ago and I was given a nice new house with running water, sewage, flush toilets. I've been in most houses down in the settlement, most of the native homes; they have to have a barrel, they have to go out at nights. I don't understand this difference.

Then all the people outside say, "Okay, why don't the native people stand up and start an industry?" First thing, they have no bank, and when they go outside and try to get a loan, nobody wants to stand up for collateral for them so they're back in that little vicious circle. I think really that we in Fort Chip haven't had too much impact on the government because of distance and other reasons. I hope that the fact that our people have stood up today will have a bigger impact. That's all I've got to say.

DR. W. R. TROST

Ladies and gentlemen, we will break for supper and then meet again this evening at 8:00 to continue our discussions.

[ADJOURN FOR SUPPER]

DR. W. R. TROST

Ladies and gentlemen, we can now begin the evening part of our hearings. I would like on behalf of my colleagues and the other visitors to the Fort to first of all thank the Women's Voice of Fort Chipewyan for that lovely potlatch we had. We were tremendously pleased with it. Thank you very much.

I'd like to now call on Pat Mercredi to address himself to some of the questions that have been put to him this afternoon. Pat, please.

MR. P. MERCREDI

Thank you, Mr. Chairman. After further talks with the two chiefs and our consultant and also with the people that are involved in this presentation I am now going to read the questions that were pointed to us during the meeting this evening.

The first question was, even when the water levels are restored will it help all the community earn a livelihood. The answer to that is that the benefits of restored water levels would help everyone, whether or not he traps. It will also encourage more people to trap and fish, including the younger ones. Restored water level will maintain our environment, and enable our community to be attractive. But the stored water level will only be a direct benefit to a certain percentage of the people, and for the remainder of the people, including the younger ones, you must look to develop a base on the resources we have in this area.

The second question was, do you think that after the water levels are restored and the people are getting the benefits from opportunities in Fort McMurray, extra local economic development will still be necessary. The answer to that is, regardless of water levels in Fort McMurray, local developments are critically necessary. And the training to match the local opportunities. Past experience indicates that relocation often failed, but a commuter concept to Fort McMurray from Chip might be the answer, which means plane fares back and forth for the people.

The third question was, where and how could this take place? I think this question can be further extended to the other people that made a brief. But our answer to that is that the Band is going to submit a formal written presentation, confirming and giving detailed points mentioned in its presentation today. This will be in your hands by October 7th, 1973. We would then ask that a follow-up meeting be held by you at the earliest convenience. This meeting should be held in Fort Chipewyan. We will contact you unless you wish to suggest a date and a place now.

DR. W. R. TROST

Thanks very much, Pat. Now Bertha Clark, on behalf of the Metis Association of Alberta, wishes to make a statement.

MRS. B. CLARK

Thank you, Mr. Chairman. I'd like to first of all thank Chief Marcel and Chief Gladue for allowing me to attend the meeting today. It wasn't my purpose for coming up here yesterday, and the reason I am here is because, if you have seen this native paper, the Metis Association of Alberta have an outreach program that's to help native people with job placements. We're sponsored by Canada Manpower, and I was here today to see if the people were interested in the LIP program.

I have my office upstairs in the Hills Building. I have many of my friends come from Fort Chipewyan who are treaty people, and I do my utmost to help them. If I can't I find other agencies who I know should help them.

I would like to say that I am very pleased to see the community support each other here today. The different organizations who gave their submissions I think were all very good and something that you really need. I know what it's like for the people coming from the isolated areas into Fort McMurray to try and find a place to live. Right now there are many jobs, but people cannot afford to live there or even find accommodation. If you find it it's $300 a month; if you want to build a house first you have to buy a little piece of land which is $7,000. How can our native people survive, even in Fort McMurray where jobs are plentiful?

If you can do something here in your own community for yourselves you have my full support in that. Thank you.

DR. W. R. TROST

This afternoon we received some submissions from students in the school here. We read them during supper and some of them were quite interesting to us. I thought I might ask Mr. Flook to read the names of the students who made these submissions and to perhaps read extracts from them for the record.

MR. W. A. FLOOK

The young people involved are Raymond Gladue, Lucy Tuccaro, Julia Marten, John Robillard, Marvin Vermillion and Raymond Tuccaro, and I'll read random excerpts from their essays. They are all in response to what appears to be a series of essays on the subject "Road out of Fort Chip".

> "There should be an all-weather road here in Fort Chipewyan, leading to Fort McMurray and Fort Smith. Then the food and clothing

> will be a lot cheaper. Transport trucks could bring more goods than an airplane can. Besides the freight costs more in an airplane than in a transport vehicle. When the students are going for sports to Fort Smith they won't have to wait until the winter road is open. They could go at any time of the year, or if they went to Fort McMurray they won't pay even half as much as they do in an airplane."

> "Tourists can come in. They could study the landscape and take pictures around Fort Chip. There might be bigger industries, the fishing industry might not be the only one in Fort Chip. The people will be able to make more money on the new jobs . . . . The teams won't have to go to other places to compete against other teams only in winter. They will also be able to go at other times of the year, in the summer and in the spring."

> "We would also like an all-weather road going out of Fort Chipewyan. We would get fresh fruit and food coming in. Then we won't have to wait for the barge, which comes irregularly. Without the road we just have barges in the summer and Monarch trucks in the winter."

Not all of these were entirely in favor of the road. There are some more excerpts.

> "They who are going to build the road are going to have to spend lots of money. And it will take them a very long time to build the road because this part of Alberta is rough country . . . ."

> "Some companies might put TVs and other things in Fort Chipewyan and companies can all be together and would be very powerful and be able to get more things from the government . . . . The only problem would be pollution, killing, drugs and trouble, but I think it would be solved by the police because there would then be more police."

> "If the road opens maybe there will be drugs. Such things as marijuana and all kinds of the stuff. Some other diseases will be here and even tourists might come in."

[Refer to page 366 of these proceedings for typed copies of the student letters.]

DR. W. R. TROST

Thank you. We now invite you to come forth with any comments or questions that you now might have on the things that have been brought up here today.

OPEN DISCUSSION PERIOD

MR. S. MARTEN [Translated from Cree]

Thirty-four years ago they had dammed one creek. After they had dammed that creek for about three or four years nobody trapped. After three or four years the place was open for trapping and they said they got ten times more fur from that place where it was dammed than from any other place. About trapping, the water is the boss. No water, and you can't get anything to make money with, or any kind of living. When there is water there are waterfowl, moose, lots of muskrats and lots of beavers. The right level of water—not too much and not not enough, but the right level of water. Twenty years ago, how many thousands of muskrats had been killed by trappers in this area? At one time it was a great place for trapping when there was water. When there were shortages of water, there was nothing.

Now today they have got a dam over at Quatre Fourches and they're trying to revive the country to live in. With this dam that they're going to build, they're going to revive this whole delta. A rich person, when he wants to do something, he can do it. This dam has been talked about for a long time. After the dam is finished it is going to benefit everybody, just the right depth of water. In trapping, water is the boss.

DR. W. R. TROST

Some of the land has become dry. If that land is made wet again when the dam is built, will it be able to be productive again for your purposes?

MR. S. MARTEN

Yes, a person can make his living out of it.

DR. W. R. TROST

Now, the dam at Quatre Fourches is still partly in. Should that dam be kept in until the new weir is built?

MR. S. MARTEN

Yes.

DR. W. R. TROST

Thank you. Now, during the supper break one or two people mentioned to me some problems they thought might arise in respect of transportation—moving boats on the rivers--because of the underwater weir. I wonder if those two gentlemen would come forward and make their comments, please.

MR. E. GIRARD

My name is Emile Girard. I was wondering if this weir is going to stop all boats from going down the Rochers River.

DR. W. R. TROST

Because they couldn't go over the top of it, you mean?

MR. E. GIRARD

Yes.

DR. W. R. TROST

Because it was too shallow, or too quick?

MR. E. GIRARD

I was told that the water's going to be too fast, so you can't come up there.

DR. W. R. TROST

Are you suggesting that a bypass route or something should be done so that boats can get around the weir?

MR. E. GIRARD

Well, yes, I think there should be because it would take you a long time to go around the other way.

DR. W. R. TROST

What kind of boats would be involved?

MR. E. GIRARD

Well, I'm thinking of small boats, you know—kickers, outboard kickers.

DR. W. R. TROST

Do they use that stretch of the river regularly?

MR. E. GIRARD

Quite a few people use that—some people trap down there. I use it quite a bit myself.

DR. W. R. TROST

Is there any other route through the delta that bypasses that particular—

MR. E. GIRARD

Yes, there is. You can go up the Quatre Fourches and come down the Peace River, but it's a lot of extra travelling.

DR. W. R. TROST

How much farther would that be?

MR. E. GIRARD

I'm not sure, I think it's around thirty miles.

DR. W. R. TROST

I see. I think this is an important point. Is there anything else you'd like to add to it?

MR. E. GIRARD

No.

DR. W. R. TROST

Thank you very much. Yes, Mr. Carbery.

MR. J. CARBERY

Some of the people pointed out that at the present dam site, they have to portage the boats up over the rocks and damage the bottoms of the boats. The comment was that if you can spend a quarter of a million dollars on putting the dam in, surely you can spend $300 in putting some kind of a windlass or some kind of a contraption in whereby they could winch their boats over more easily. I assume that if what Mr. Girard said, that if a new dam is going to cause the same problem, some kind of an apparatus could be put in to facilitate people hauling their boats across.

DR. W. R. TROST

Are there further comments or questions that people in the audience wish to address to this question?

CHIEF F. MARCEL

I have a question I'd like to ask. Many people inquired to me about the Park area. Since the water has been lost in the Park, even so they've put in the dam at Quatre Fourches. In the far back area many of the small lakes have been dry during the dry years, and even so water came back a bit in there. Lake Mamawi or Lake Claire. It doesn't mean that in the back areas the water never did come back. So there was a question, how can we work and help on this to get the water back in this back area.

DR. W. R. TROST

Ron, this is in the Park—do you want to make a comment on it?

MR. R. P. MALIS

I'm not too familiar with what the situation is in the back area of the Park—perhaps somebody from the Canadian Wildlife Service may be here and would perhaps comment on that.

DR. W. R. TROST

Do you want to talk on that, Frank?

MR. F. J. FORBES

I think what you're referring to, Fred, is the perched basins, and with the Rochers weir in place this should bring the water level up high enough, particularly in years of high runoff, to flood the basins again. I think that's the question you had. The levels that we get with the Rochers weir in place will depend on how heavy the flow is in the Athabasca and the Fond du Lac Rivers that year, and given that we have a heavy runoff then we will get high water levels, up to 690 again, which will completely flood the perched basins.

CHIEF F. MARCEL

Yes, this we understand but already these people know how long they have been suffering from losing the water and if the dam is going to be put on the Rochers, how long more will they have to wait before they can get this water back? So, if anything could be done at the present time when waiting for the water to come back—this is the idea of the people.

MR. F. J. FORBES

I think, Mr. Chairman, he is asking a different question—if something could be done in terms of a series of small dams or channels. Given the number of perched basins which would be affected, this would be a pretty massive undertaking in the whole delta. Perhaps in certain areas where there's a lot of traplines something might be done in this area, but I wouldn't suggest it as an undertaking for the whole delta. It would be just too big a job.

DR. W. R. TROST

Does that answer your question, Chief Marcel?

CHIEF F. MARCEL

Yes.

DR. W. R. TROST

I think you have questions in your mind, and I think it would be helpful to us if you continued with questions.

CHIEF F. MARCEL

The reason they brought this up to me is from the Cree Band from the Park. On our reserve in this past two years—I didn't do it this year but the year before, two years in a row and during the summer months I put in a little bit of work by hand work— we have a few ditches we put into the lake from the river and also we closed up a few outlets from some sloughs that were draining out. We knew where they were draining out from, and used a small amount of money that we received from Indian Affairs and this we've been doing. We find it was worth while doing because we see that it holds the water back and the muskrats started to come back in that same area. If it's possible the Park people can do this, but I understand since it's in the Park they have to deal with the Park Wardens on this.

MR. F. J. FORBES

These have been very effective, the projects that Mr. Marcel is referring to. I think the question you are asking, Fred, is how do you get additional assistance to do this. We gave them some help under the Delta Project to do this and I believe that perhaps this question could be directed towards the Implementation Committee, and Indian Affairs as well. Does that answer your question?

CHIEF F. MARCEL

Thank you.

DR. W. R. TROST

Are there further questions or comments to put forward?

MR. W. ANDERSON

Good evening. I am with the Native Communication Centre. My question is that if the Bennett Dam is causing all this, why are there no representatives from the British Columbia government here.

DR. W. R. TROST

Shall we take that question and send it to Victoria? [Laughter]

Please come forward with anything that's on your mind— any comments or questions. Chief Gladue.

CHIEF A. GLADUE

Thank you, Mr. Chairman. Ladies and gentlemen. Once more you have given me a chance to make comments to these officials of the government.

These people here in this community, the Cree and Chipewyan Band and Metis Association and all these people that brought up their comments here at this conference—it's a pleasure for me to hear some of these people. People from Fort McMurray are here—I'm glad to hear it. Our people, we lived here many years ago. We're still living here. We are born here. We die here. We are still here. People here are trappers, living off the land, fishing and hunting. Beavers, muskrat, fish, all kinds of game. The water was flowing, to give us food. Mr. Sal Marten, one of my members, brought up the question, the water is the boss. I agree one hundred percent, the water is the boss, because the water brings us food for our survival.

Now the people here, we trap in this Wood Buffalo National Park. We were raised there, we trap there all our lives. We still continue on—we're not quitting trapping in that area. We saw that we lose water on account of the Bennett Dam, where they steal water from us, from us poor people. We went from meetings to meetings—Edmonton, Calgary, Banff, all over the place—trying to do something for this community. We got the dam started here in Quatre Fourches. This dam, it made pretty good results for the area, Mamawi Lake and Birch River area and the lake. The water is there. I don't expect that I'm going to go trap there and make a fortune of it, but it takes time, I think. It won't take two years—it'll take four or five years before I can get something out of that area.

People are pulling their boats over, and damage their boats and damage their outboard motors to go over this dam. They promised us they want to put some kind of a winch over this dam so they can send their boats over it. That hasn't been done. Those kinds of problems.

I'm saying to my people here, don't be afraid. If you have got problems, come up and ask about your problems. Don't wait for me—just go ahead and ask. These people of government are here. This is the time to bring up the problems.

Mr. Chairman, here again I'm going to ask a question. The weather is not very good at this time of the year, also during the spring. This Fort Chipewyan airport here—how does it look like to you? Do you think it's a good airport? We've asked for this airport to be hardtopped. If they hardtopped this airport you'd have no problems to get out and in.

Mr. Chairman, again I have another question. I was down at Ottawa in February. This was my first trip to Ottawa. I was talking to the Minister, and this is why I was in Ottawa. I asked him three questions. One, for land entitlement for the Cree Band. Second one, logs for their own use, their buildings, from the Park. Third question, buffalo meat for the Fort Chipewyan community—not only when we need the buffalo meat are we going to ask for buffalo meat. We want meat every winter from now on. It sounded really good to me when the Minister answered it, "We will see that you people get meat that is fit to eat." This is the kind of answer he has given to me. I believe there is a Parks Canada man here, and I'd like to see what kind of a comment he'd give to our question on this.

DR. W. R. TROST

Chief Gladue, in respect of your two questions, I think your first question is pretty easy to answer, the one about what condition the airport is in. I think we all kind of agree that at least today its condition was certainly far from perfect, and we certainly think that it would be a help if in the future it was at least drier.

I take it, regarding the three questions you had addressed to the Minister at Ottawa, you are now asking that those same three questions be answered again, is that right?

CHIEF A. GLADUE

Yes, Mr. Chairman.

DR. W. R. TROST

What answers did you get from the Minister?

CHIEF A. GLADUE

I don't read or write, but I just am keeping some of the things right in my head here, you know, so down the road maybe some part just fell off, I don't know. But I'm pretty sure I got some answers in a letter; it went to the Fort Smith head office, I guess. But the answer I got for the logs is that I could get the logs I want for the Band hall, and also we'll get logs for the members, for their own use for cabins on the traplines.

DR. W. R. TROST

I think that we can ask Mr. Malis to answer the questions that the Minister left unanswered.

MR. R. P. MALIS

We had a very useful meeting, at which I was present, in Edmonton a few weeks back with you and Chief Marcel and some others, where we discussed the question of logs and I believe it was left that there was no question with respect to logs for your community hall, and that areas in the Park had been identified for you to take logs for this purpose.

On the question of logs for trappers' cabins and such like, I believe that you were going to talk to the Park Superintendent and pass on to him your needs for logs for this particular purpose. Unfortunately, while he was supposed to be here today he couldn't get out of Fort Smith. But I indicated to you in Edmonton that I didn't see any particular problem here in providing logs for this sort of thing that you just mentioned, and I don't see why this couldn't be worked out.

On the question of buffalo meat, I believe the Minister did make a commitment to you to see that you got meat, and again I think the same sort of arrangement could be worked out as took place a few years ago when we did kill off a number of buffalo and provide for you. I think we have to get together to talk and to see how this can be best organized, and brought about. My people in the Park here are willing to sit down with you at any time to discuss this matter.

CHIEF A. GLADUE

Thank you. What I'm trying to say about buffalo meat . . . . As I see right now for this community, it's isolated. There is administration here by the Cree and Chipewyan Band. We see that the welfare is . . . it's all right, but the food market here in Fort Chip—as I see now for this winter, I think half of us, we're going to have to half starve. Our children here, they're going to still attend the school half starving? With that little welfare you give them? No. We want buffalo meat this winter before we starve. If I'm going to get hungry and my little children are going to get hungry I'm going to take a rifle and I'm going to go to that Wood Buffalo Park and start shooting, whether you like it or not. This is what I will do.

DR. W. R. TROST

Further comments and questions, ladies and gentlemen?

MR. P. MERCREDI

I think up to now we have been very positive in the way we have been presenting our questions, but one question I'd like to bring up to you, Mr. Chairman, is about the Bennett Dam. They are the people that caused this hardship on this community and I don't believe they're that broke that they couldn't make it down here to Fort Chipewyan. I believe there is a case that's being worked out in Vancouver at the present time, and I want to know how far they have gone to this date. Maybe they may have some answers.

DR. W. R. TROST

I think I should say that there were two people from British Columbia Hydro in our office yesterday who were trying to get out to this meeting today, but no planes were landing. The PWA flight, as you know, didn't come in and the extra flight that Pacific Western was trying to put on today so that an additional twenty or so people could have come to these hearings, they weren't able to put it through because the airport, as Chief Gladue has indicated, wasn't in too good shape. But there were two people from B.C. Hydro who wanted to be here today.

MR. P. MERCREDI

At our next consultation, can you get these people down here? I believe we'd like to get some answer on this thing as far as compensation for trappers and fishermen.

DR. W. R. TROST

I'm not sure we can say that we can do that. We can of course write them a letter but we can't in any way bring them here if they don't want to come. But, Pat, are there not negotiations going on now between the trappers and the B.C. government?

MR. P. MERCREDI

I believe there are, but so far we don't know how far they have gone.

DR. W. R. TROST

Is it before the courts?

MR. P. MERCREDI

Yes.

DR. W. R. TROST

I think when a thing is before the courts the side that is apt to lose the case is very reluctant to have too many discussions.

MR. P. MERCREDI

There's one other question I would like to bring up which might be harsh, but this environmental board that you have now, is it some kind of a particular implication that's been brought up to cover up the issue on Bennett Dam?

DR. W. R. TROST

No, not at all. Particularly since as far as the Bennett Dam is concerned we are not any of us on the panel here in any way connected with the Bennett Dam.

MR. P. MERCREDI

What type of compensation has been given to Alberta for damages brought into our province?

DR. W. R. TROST

Through the Bennett Dam?

MR. P. MERCREDI

The Bennett Dam government.

DR. W. R. TROST

I think none whatever. I think there's no settlement whatever, as of now.

MR. P. MERCREDI

Thank you.

DR. W. R. TROST

Further questions or comments?

MR. F. LADOUCEUR

Mr. Chairman, ladies and gentlemen. Just a few minutes ago Chief Marcel was speaking on behalf of the Cree Band in the Park and also the Reserves—water conditions and so on. A friend of mine and I generally sit together a lot of times and discuss a few things, but we thought this weir wouldn't solve all the problems. It might help the Park but I don't think it will solve all the problems in Alberta in the delta, Alberta side. What is needed to get the water back faster into the areas is, like Mr. Forbes mentioned, ditches, dams. But just by hand with a pick and shovel we can't do as fast work as could be done with a cat, a little D4, with a barge that can get around on the rivers and the lakes where a dam or a ditch is needed. You can make a ditch wide enough when the water comes so high and then the water will fill these lakes. I think that would solve a lot of the problems we have.

DR. W. R. TROST

Have you places in mind where the ditches might be, Frank?

MR. F. LADOUCEUR

Yes I do, a lot of places on the lake, you know. But for the Reserve I think the Chipewyan Band know the places which could be ditched and dammed.

DR. W. R. TROST

So it would be a combination of ditches and dams in addition to the weir, is that what you're suggesting?

MR. F. LADOUCEUR

That's right.

DR. W. R. TROST

Frank, do you want to make any comments on that?

MR. F. J. FORBES

I think that this type of project should be supported. It's been tried in the Reserve already and it works successfully, as Frank has indicated, and it ties in with the recommendation which we had in the report to provide technical and financial assistance for trappers and fishermen. I think that it's a case now for the Implementation Committee, who have either been asked or are being asked to look at the other recommendations in the study, to have a look at this and contact the operating agencies to see what can be done to set it up.

DR. W. R. TROST

In essence, you're agreeing that his suggestion has good merits.

MR. F. J. FORBES

Yes. What you're doing is you're going into intensive management in certain areas of the delta to increase the muskrat populations, and this is what you want, isn't it?

DR. W. R. TROST

Thank you. Further comments or questions, ladies and gentlemen?

MR. R. SIDDALL

We have been hearing a lot of comments on things that are not related specifically to the weir, and you've indicated time and time again that you agree with some of these comments, such as paving the runway or road. Now, the way I understand it, the board is only directly concerned with the weir. These other things which we have been saying, how effective are they going to be after you have passed them on to the other people concerned, the other departments of government? It's all very nice to get a memo from you people or a book or report that's a few hundred pages thick, but how effective are these reports going to be to the departments of government concerned?

DR. W. R. TROST

Well, we are competent and able to pass on and make recommendations on any of the submissions that are placed before us. What actions will follow from that, of course, is not for us to say at this time.

MR. R. SIDDALL

So, for other types of recommendations, will there be any other meetings set up by your department with other governmental agencies to try and look into some of these problems further?

DR. W. R. TROST

We can go forward in suitable ways, depending on what our own view is of these matters, yes.

MR. R. SIDDALL

So what you're saying to me is: we said all these things, you're going to make a report of it, and it's basically up to us to go after them anyhow, the way we've been doing ourselves.

DR. W. R. TROST

No, what I'm saying is that all of the submissions that have been made today are in our view relevant.

MR. R. SIDDALL

Okay, thank you very much.

DR. W. R. TROST

Further comments or questions, ladies and gentlemen?

MRS. B. CLARK

I just noticed some Park Wardens here and I wondered if they might have had some directive from their Minister towards the buffalo for the people of this area.

DR. W. R. TROST

Does the Park Warden want to speak on that question?

MR. R. P. MALIS

I don't know if it's altogether necessary for the Park Wardens to speak on this. What I said before with respect to the buffalo meat situation will be ultimately handled between them and the local community once discussion with the Park Superintendent and his staff takes place with the respective chiefs and other members. So I don't think that it would be fair to call upon any of these people to comment on this point.

DR. W. R. TROST

Are you satisfied with that, Mrs. Clark?

MRS. B. CLARK

Well, I don't really know because I would think that these people working in this Park should know what's coming from their superiors and they should in turn inform the people. From what Mr. Gladue says, he's not too sure because he makes the statement that, whether or not they were given permission, they were going to go get their meat, so there must be a doubt as to whether they know whether they're going to get permission.

DR. W. R. TROST

Yes, I think Mr. Malis has indicated that the instructions haven't yet gone to the Park Board, isn't that right, Mr. Malis?

MR. R. P. MALIS

Yes.

DR. W. R. TROST

Further questions or comments?

Ladies and gentlemen, we've enjoyed very much being here. We think this has been an excellent meeting and that you have come forward with good points which you have expressed very well, and we want to thank you for that effort. I can now declare the hearing adjourned. Thank you very much.

[ADJOURNMENT OF FORT CHIPEWYAN HEARINGS]

THE RESTORATION
of
WATER LEVELS
in the
PEACE-ATHABASCA DELTA

PUBLIC HEARINGS
URANIUM CITY
SASKATCHEWAN

ENVIRONMENT CONSERVATION
AUTHORITY

ALBERTA

Interpreter:
Mrs. Emily Jones

MR. F. A. HEAL

I'm Fred Heal, and I'm with the Saskatchewan Department of the Environment. On behalf of the Governments of Alberta, Saskatchewan and Canada, I'd like to welcome you to the second in a series of three public hearings to be held on the restoration of water levels on Lake Athabasca and the Peace-Athabasca delta.

I might say right at the outset that we have Mrs. Emily Jones available to translate what you have to say into Chipewyan. We will determine this as is necessary as the hearing proceeds today; if there are people here who require translation, Mrs. Jones will be available.

This particular hearing is being hosted by the Saskatchewan Department of the Environment. The series of hearings in general was initiated by the Environment Conservation Authority, Province of Alberta. Saskatchewan and Canada are assisting in the co-sponsoring of the hearings. We are very fortunate to have the assistance of Bill Flook and his able staff from the Environment Conservation Authority. We would ask you to register with Bill if you have briefs or statements to make so that we can get an idea of the number of statements and briefs that will be presented today.

I know many of you will have questions or points of view, and we welcome these at any time in the hearing. It is not necessary to register if you want to ask a question or make a point of view; this is only for people who have specially prepared statements. If you prepare something in the course of the day and you want to get on the formal schedule again, see Mr. Flook and he can make provisions for that.

The job of the panel is to attempt to clarify statements that are made today. They will ask questions of people who are making various statements to make sure that their position and their statements are readily understood and consequently will be easily interpreted as the results from this hearing are summarized and reported along the various stages. There are also a number of technical people here as well, and if you have questions which require technical answers they will be available to try and answer them. If they can't they will know where they can find the answers and perhaps pass them along to you.

Let me now turn today's meeting over to the Chairman of the panel, Mr. Stan Blackwell, Chief of the Water Management Service, Saskatchewan Department of the Environment.

MR. S. R. BLACKWELL

Thank you, Fred. Good morning, ladies and gentlemen. Welcome to this public hearing on the proposed Peace-Athabasca control dam. I would particularly like to thank the people of Uranium City for the fine hospitality they have shown us and I would like to extend a special welcome to the large school delegation that is here and to our out-of-town visitors who, I believe, include a delegation from Fond du Lac.

I'm representing the Saskatchewan Department of the Environment. Also on the panel with me are: on my far left, Mr. Gordon Koshinsky from the Department of Northern Saskatchewan; on my immediate left, Professor Stan Rowe, Chairman of the Saskatchewan Environmental Advisory Council; on my immediate right, Philip Dowling of the Alberta Environment Conservation Authority; next to him is Fred Durrant of Environment Canada; and on the far right is Ron Malis of the National Parks Branch of the federal Department of Indian Affairs and Northern Development.

The purpose of this hearing is to listen to your views and comments and to get your advice on the proposal to construct an underwater weir at the outlet of Lake Athabasca. This was one of the major recommendations of the federal-provincial Task Force that studied the problems of low water levels on the lake and in the Peace-Athabasca delta over the past three years. The purpose of this weir would be to offset the effect of the Bennett Dam in British Columbia and restore a normal water level regime on the lake and in the delta area.

I would like to emphasize that a final decision has not been made to build this proposed weir. However, if the public reaction to this major recommendation of the Task Force is favorable, the Governments of Saskatchewan, Alberta and Canada are prepared to build it during the next year or two as a joint undertaking. As you probably know, public hearings were held in Fort Chipewyan on Tuesday, and next week more hearings will be held in Edmonton. After these hearings, representatives of the three governments will be carefully reviewing what they have heard and studying the briefs that have been presented. Based on that information, they will then prepare a report with recommendations to the governments on the further action and considerations which should be given to the proposed weir.

It is very important that we fully understand what you have to say to us today and with this in mind I would like to conduct this hearing in a relaxed, friendly atmosphere and I hope it will not be necessary to limit the discussion. We want to give everyone a chance to be heard so I would ask that you please recognize the Chair and that you respect the point of view of the various speakers even though you may disagree with some of the things they may have to say.

Turning now to the agenda and procedures we will follow, our first speaker will be Mr. Frank Forbes of Environment Canada. He is in charge of the Peace-Athabasca Delta Task Force which studied the problems of low water levels. He will set the stage for our meeting by talking about the events leading up to the study, how that study was carried out, the findings, the conclusion and the recommendations that were made. Following his presentation, I will give you an opportunity to ask questions on that study. The second speaker will be Dr. Stu Smith of the Alberta Department of the Environment, who will present Alberta's environmental impact assessment of the situation in the delta with respect to water levels, the effect of Bennett Dam and the advantages and disadvantages to be obtained from building the proposed weir. Following Dr. Smith's presentation we will hear from Mr. Grant Mitchell, the Deputy Minister of the Saskatchewan Department of the Environment, who will present Saskatchewan's assessment of the situation with particular emphasis on Lake Athabasca, 70 percent of which lies within this province. You will also be given an opportunity to question both Dr. Smith and Mr. Mitchell following their presentations.

When we have heard these introductory talks we will hear the various briefs and verbal presentations from the floor. I propose to call first upon those people who have written briefs prepared, and following that to ask for verbal presentation from anyone who cares to speak. Fred Heal mentioned that there are a number of other government officials here today and I'm sure that they will be able to answer any technical questions that you may have. These include a number of people sitting up in the front row: Mr. Ron Johnson, the Superintendent of Fisheries for the Saskatchewan Department of Natural Resources; Mr. Gerry Townsend from the Canadian Wildlife Service; Mr. Reg Bailey, the Assistant Deputy Minister of the Alberta Department of the Environment; and Mr. Gordon Poupore of the federal Department of Indian Affairs and Northern Development.

Now, ladies and gentlemen, I would like to get these hearings under way by calling upon Mr. Frank Forbes to talk about the Peace-Athabasca delta study.

> [Mr. Forbes here summarized the Peace-Athabasca Delta Project Group Technical Report. A summary appears on page 43 of these proceedings.]

QUESTIONING

MR. S. R. BLACKWELL

. Thank you, Frank. I would now like to ask if anyone has any questions on the study that was carried out.

MR. E. ADAMS [Translated from Chipewyan]

It was a good idea to put in a dam. About nine years ago, before they put up the dam out in B.C., they used to have beaver dams along the banks of the river and Lake Athabasca. But since they put a dam out there, all the beaver dams have dried up and there are a lot of animals being destroyed.

MR. S. R. BLACKWELL

Are there any more comments or questions with regard to the study that was carried out?

Then I would like to call upon Dr. Stu Smith from the Alberta Department of the Environment to present Alberta's assessment.

[Dr. Smith here summarized his report, which appears on page 1 of these proceedings.]

QUESTIONING

MR. S. R. BLACKWELL

Thank you. Are there any questions on Dr. Smith's presentation?

MR. J. BRACONNIER

My name is John Braconnier, and on behalf of the students of Uranium City, I would like to know if this weir that they are building on the Rochers River just thirty miles north of Fort Chipewyan would have any effect on the people north of Chipewyan. Would the water flow into the Slave River? Would that be decreased at all in its flow?

DR. S. B. SMITH

Mr. Chairman, it's a point that I mentioned in my paper and I think it is an important one to ask. The effect of the Rochers dam will be to store water on Lake Athabasca— several million acre feet— the way it used to be stored by the blockage of the Peace. Any effects downstream will then be the true effects of the dam in B.C. rather than any action caused by storing water so that the real effects on the lower Mackenzie may be shown if we put this other control structure on for repairing the resources in the delta. It will not be because the Athabasca region is causing it but because the real effects of the dam in B.C. are now being felt.

MR. J. BRACONNIER

So that area will then just continue on as usual, as it was before the Peace River dam was built?

DR. S. B. SMITH

I don't think anybody can say because there are not enough studies to predict yet whether there will be any effects. As far as we know, the effects would be very slight on the two deltas downstream, the Slave delta and the main Mackenzie delta, but I think it would be unfair to guess what effects may be.

In addition, the Canadian government, Territory governments and some of the companies that are looking at the oil pipeline route are gathering more information on the lower river, which will be available within the next year or so. But the information is not complete enough to be able to guess very closely what effects there may be.

MR. E. F. DURRANT

Regarding the student's comment on the effect of the Rochers weir on the levels downstream, some very recent studies indicate that the building of the Rochers weir would lower the average levels of Great Slave Lake by a tenth of a foot. About that much. The Bennett Dam effects will still be felt on Slave Lake, but the effect of putting this weir in on the Riviere des Rochers will have a slight lowering effect on the levels of Slave Lake about that much, which is fairly small.

DR. S. ROWE

I was not sure that the student understood exactly what Dr. Smith was saying and so I would like to ask you, Stu, aren't you really saying that we are solving our problem but really we are not too sure what the effect of the Bennett Dam will be downstream from this proposed weir? In other words, we solve our particular problem; we don't really know yet what the effect would be even though it only decreases the level of the Great Slave Lake by a tenth of a foot. What might be the effect, say, of silting on the Slave River, of changing channels, all these imponderables? Is that a fair assessment?

DR. S. B. SMITH

Dr. Rowe has put his finger squarely on it. The engineers can calculate with reasonable exactness what will happen downstream. But people who are studying the living animals— the fish and birds and muskrats and moose and this kind of thing along the river— don't know what the effect will be on them yet. But our effect on the lower river, as Mr. Durrant has pointed out, is quite small compared to the major effect of the river regulation further upstream.

MR. F. J. FORBES

Just further to your comment, Dr. Rowe, I think that we should make it clear that the building of the Bennett Dam has created a completely new regime on the Peace and the Slave. For example, the average discharges in June used to be something in the order of 300,000. Now with the generating plant in full operation the proposed release will be around 36,000 to 39,000, so that you are dealing with a new regime. What we are proposing here, compared to that, would have little effect.

DR. S. B. SMITH

There was one further comment that I wanted to make, Mr. Chairman. That is that we all agree, those of us who have been studying the situation, that we must continue to get more information in relation to the effects of the proposal on the people in the next few years, not just up to the present time. We want to continue trying to make a better use of the resources along the lake.

MR. S. R. BLACKWELL

Are there any more questions?

The next presentation, then, is from Dennis Classen.

MR. D. A. CLASSEN

Mr. Chairman, I'm Dennis Classen, biology teacher from the Uranium City High School. I would like to make a few comments on the proposed weir. Perhaps my understanding of ecology isn't what it should be, so I would like to direct this to some of the biologists in the group.

If you take a look at the Technical Report on the Peace-Athabasca Delta Project and note the graphs of the water levels that will result from the proposed weir you will see that the water level will be raised but the overall effect of the raised water level will not restore the fluctuations that occurred under the natural hydrological regime prior to the building of the Bennett Dam. To be more specific, under the natural hydrological regime the fluctuations on Lake Athabasca were in the neighborhood of approximately three and a half feet per year. Under the modified regime the fluctuations that occur without the weir are in the neighborhood of approximately half that, should we say about a foot and three-quarters. If a weir is installed the water level will be restored to the original high levels prior to the building of the Bennett Dam but the degree of fluctuation will not be restored. The water will not fluctuate the three and a half feet that it used to.

As I understand succession and ecology, it appears that the key in the whole issue is not necessarily the water level but the fluctuation in the water level which results in the flooding of the marshes and the perched basins in the Athabasca delta. The thing that we should be concerned about is that we maintain this fluctuation of water level, not necessarily that we maintain the level, because in the long run supposedly the ecology should stabilize itself and although we don't have delta where we once had delta, it will be delta in a slightly different spot. It should equalize itself at a lower level.

The key, as I understand it, to the maintaining of a delta is the maintaining of the fluctuations of the water between high and low and in my understanding, as I look at the Technical Report, we will not be maintaining these fluctuations with this proposed weir.

DISCUSSION

MR. S. R. BLACKWELL

I'd like to first ask Frank Forbes to respond with regard to the fluctuations and then ask Stu Smith or Gerry Townsend to talk about the ecological aspect.

MR. F. J. FORBES

You are absolutely right in your observation with the weir. I'll go back one step and maybe I can give you a fairly simple answer, and if you want to pursue it we could do it later together.

We are concerned about two things, as you have noted: the average level during the growing season, which we have defined as May 15 to August 15 and which is important in terms of the plant succession; and in the amplitude or the flood level for flooding the perched basins. With the weir we can set the sill level so that we can obtain the average summer level which occurred before 1968. However— and this is due to a limitation in the hydraulics of the proposed structure— we can't quite create flooding amplitude. In other words, when we put the weir in we are still going to lose some of the meadows because we just can't get the change between the average level and the peak level. We have discussed this with Parks and they are prepared to accept some loss of meadow as opposed to going to another kind of a structure which would probably be one with gates and would require regulation.

That's a simple answer to it and, if you would like, perhaps Mr. Townsend could elaborate on the consequences of the loss of amplitude in terms of the plant and animal life.

MR. D. A. CLASSEN

I think that loss of amplitude is significant and I would like to see it expressed in the actual loss of meadow and marshes which we are proposing to save. I don't feel that in Saskatchewan we have any idea of what this loss of amplitude will do to our bays and inlets on the north shore of Lake Athabasca in terms of maintaining meadows and marshes and spawning grounds for the fish of Lake Athabasca, and also— though this may seem to be a small point— to maintain our sport fishing holes in the status that they used to be prior to the building of the dam.

MR. F. J. FORBES

Gerry, I think it would be helpful if you commented on that last point.

MR. G. H. TOWNSEND

There is a table in the Technical Report on page 135 that presents the results of a computer predictive model that was written to attempt to translate the effects of the water level fluctuations and the levels themselves on the productivity of some of the major wildlife species on the delta. We used the limiting factors of the various species— the nesting success for the waterfowl, the over-wintering depths that were required for the muskrat and so forth— programmed into the model to test the water level effects.

If you look at the table, the shoreline miles are an indication of the amount of perched lakes that have water in them and the average reduction over a number of program runs, compared with the natural regime with the Bennett Dam in effect, was 51 percent. In other words, we would lose over the next 20 or 30 years 50 percent of the shoreline available on the delta if nothing were done. If you look at the far column to the right, with the proposed weir in effect we are able to restore approximately 25 percent of that, still a loss of 24 percent when you compare it to the natural regime.

So the amplitudes that we can reconstruct with the weir are still not bringing it back to the natural conditions, but they do bring it back part way for the restoration of the perched basins. When you consider some of the wildlife species you find that the success the waterfowl have in nesting on these perched basins is somewhat greater than it was under natural conditions, because the flooding occurred during the summer and wiped out a bunch of the nests. So it is a trade-off between flooding and filling these basins in the summer, which destroys nests in some years but also gives you the maximum amount of shoreline, and the increased success with less amplitude. If we make the comparison there we predict that we will almost restore the productivity of the dabbler ducks on the lake, and you can see varying amounts of success with some of the other species.

MR. D. A. CLASSEN

Thank you. I'm wondering why we are going for a 50 percent program, in other words to save 25 percent of the shoreline, as indicated in that chart, and not for a gated structure whereby we could completely restore the natural regime.

MR. F. J. FORBES

We looked very closely at using a gated structure. The problem with a gated structure is that somebody has to make a decision as to when you open the gates and when you close them, and in this case we have Alberta and we have Saskatchewan on an interprovincial lake, and we have the Government of Canada with its national park policy to maintain the delta in its natural state. In our opinion, with the putting in of a gated structure you would have to set up a very complex board and it would be a difficult board to operate. It would be difficult to make decisions which would be acceptable to everybody. Even if you put in a gated structure— you can see this from the records from other places— there is the problem of forecasting how much water you are going to have that year and this dictates how accurately you could recreate the levels.

In our opinion because of this a gated structure wouldn't be practical. It's based on these factors. A gated structure may seem nice in theory— you push a button and open a gate, or push a button and close a gate— but in terms of making a decision to do this, in terms of getting the different jurisdictions together, it becomes a very very complex problem.

MR. G. H. TOWNSEND

As Frank mentioned, this was discussed at considerable length during the final stages of the project. If you put a gated control structure at the outlet to Lake Athabasca and do have the capabilities of forecasting the flows that are coming down from the Peace, and of forecasting the flows that come down the Athabasca and the Fond du Lac, you could probably establish a certain regime for each year, for each month and for each ten-day time period. When we look at 60 to 80 percent of the delta being located within a national park and we recognize that in the past some of the floods have been quite tremendous and have completely covered the entire delta with water, killing ducks, muskrats and bison, but nevertheless are part of the natural system, we pondered whether this was the kind of thing the people would be prepared to accept as part of the natural regime. There may be some temptation to cut off the peak to prevent this sort of thing from happening within a national park. These are parts of the natural conditions and should be allowed to occur.

Outside the National Park undoubtedly there are water level regimes that could produce many more muskrats than are produced with the natural regime. If one wanted to intensively manage for muskrats in certain areas of the delta one probably would not go to the Rochers weir or even to a large gated control structure to achieve this intensive management. I would think that one would want to divide the delta up into small compartments and to manage the marshes on an individual basis, as then you could have some places where the water levels were being held low to bring the vegetation back while others would be producing muskrats at a high capacity.

So there are a variety of needs on the delta and the Project Group eventually selected the Rochers weir as a minimum first step to attempt to achieve a reasonable approximation to the natural condition. But, if you will look at the recommendations, we also recommended that additional steps be taken in other parts of the delta to improve on the production of wildlife species that are important to the people of the area.

MR. S. R. BLACKWELL

We have one more presentation and I would like to squeeze it in before lunch time, so if you have questions perhaps you could just hang on to them until after lunch.

Now I would like to call on Mr. Grant Mitchell, Deputy Minister of the Saskatchewan Department of the Environment, to present the Saskatchewan assessment.

[Mr. Mitchell here summarized his report, which appears on the following pages.]

The Proposed Peace-Athabasca Control Structure— Saskatchewan Assessment. Prepared by Saskatchewan Department of the Environment, September, 1973.

SYNOPSIS

At a meeting of the federal, Alberta and Saskatchewan Environment Ministers in May, 1973, agreement in principle was reached on the construction of a proposed control structure on the Riviere des Rochers, the main outlet channel from Lake Athabasca, for the purpose of offsetting the effect of the Bennett Dam on the Peace River in British Columbia and restoring a normal water level regime in the lake and Delta area. This paper reviews the effect of water levels on Saskatchewan interests for the purpose of developing a Saskatchewan position on the construction of the proposed control structure.

The paper concludes that the effects of the low levels experienced on Lake Athabasca were significant, but that the direct benefits of improved regulation to Saskatchewan interests would not be great. Saskatchewan endorses the proposed control structure and requests participation in the co-ordination of the related design, construction and resource monitoring program. It recommends that Saskatchewan contribute to the costs of construction while holding British Columbia Hydro ultimately responsible for the costs of the remedial works.

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THE PROPOSED PEACE-ATHABASCA CONTROL STRUCTURE

SASKATCHEWAN ASSESSMENT

A. INTRODUCTION

The building of the Bennett Dam on the Peace River and the subsequent filling of Lake Williston, coupled with low runoff conditions, resulted in low water levels in the Peace-Athabasca Delta and on Lake Athabasca starting in 1968. Low levels had occurred before and seasonal and yearly fluctuations are normal. However, several successive years of low levels are uncommon and when the situation began to cause detrimental effects on the ecology, fisheries and wildlife of the Delta area with a resulting economic loss and hardship to local residents, public concern was aroused. There was talk of an "ecological disaster" in the making. Wildlife people and others claimed that corrective action must be taken soon or the ecological damage would be irreparable.

In response to this concern and the demands for action, a federal-provincial Task Force was established early in 1971 and a multi-disciplinary Study Group was assembled to assess the situation and to recommend appropriate remedial measures. A Study Director and support staff was hired. Government staff was made available particularly from federal and Alberta agencies. Saskatchewan also agreed to participate, but primarily in an advisory capacity. Thus, the stage was set for a full-scale ecological study which was to extend over a period of more than two years and to cost more than $1.5 million.

A Summary Report on the study with recommendations was released late in 1972. Consideration of this report by the governments concerned is still under way. However, at the Environment Minister's Conference in Ottawa in May, 1973, there was tentative agreement by Canada, Alberta and Saskatchewan that there was some urgency for action on one of the major recommendations in the report:

> "that a submerged weir control structure be constructed at the Little Rapids Site at the Riviere des Rochers to restore lake levels on Lake Athabasca, and consequently on the Delta, to approximate what would have occurred under historical conditions."

In view of the national, regional and local benefits that could accrue from the construction of the weir and because Canada, Alberta and Saskatchewan share the jurisdictional responsibilities for the management of the resources at Lake Athabasca and the Delta, Canada and Alberta have agreed to share in the cost of constructing this proposed $1 million structure and they have made a strong plea for a Saskatchewan financial contribution. In consideration of that request and the upcoming public hearings on the proposed weir it was felt an attempt should be made to define Saskatchewan's position on the whole matter.

Unfortunately there is a paucity of specific information relating to Saskatchewan's interests. The background reports for the Peace-Athabasca Delta Study focussed, understandably, on the Delta itself where the impact of low water levels was most obvious. Nevertheless, it was recognized that a Saskatchewan position must be based on factual information pertinent to the area affected in this province.

It was also recognized that from a Saskatchewan viewpoint the paramount question is the relationship, if any, between Lake Athabasca water levels and the economic and social well-being of the people living in northwest Saskatchewan, particularly the 3,500 or so living in communities on the periphery of the lake. These communities include Uranium City, Camsell Portage, Fond du Lac and Stony Rapids.

With these thoughts in mind an approach was developed for this paper which provided for review of the data collected for the overall study and discussions with numerous knowledgeable Saskatchewan people both in the government service and in the local area. These included people living in communities at Lake Athabasca itself who are involved in such things as fisheries, transportation, recreation and tourism, mineral resources and mining, hunting and trapping.

B. THE HYDROLOGICAL SETTING

As indicated in Figure 1 the primary area of interest to Saskatchewan is the 3,000-square mile Lake Athabasca which straddles the Saskatchewan-Alberta boundary and the 1,500-square mile Peace-Athabasca Delta which lies entirely in Alberta and largely within the Wood Buffalo National Park. Lake Athabasca, the largest water body in Saskatchewan, lies 70 per cent in Saskatchewan and 30 per cent in Alberta.

The drainage system to the lake and Delta is outlined in Figure 2. It consists of three major rivers, the Peace, the Athabasca and the

Fond du Lac. About 75 per cent of the runoff to the lake originates from Alberta and British Columbia, the remaining 25 per cent comes from a 45,000-square mile area of northern Saskatchewan. While this latter area is small compared to the total Mackenzie River basin it represents more than one-fifth of the total area of Saskatchewan and contains a major portion of this province's valuable northern resources.

The Delta area, delineated in Figure 3, was formed by the complex interaction of natural processes. These include variations in river flows and the deposition of countless tons of sediments brought in by the major rivers from the south and west.

To appreciate the effect of regulation of the Peace River in British Columbia it is important to note that high spring flows in the Peace River provide a hydraulic barrier which retards outflow from Lake Athabasca. This, combined with ice jams which force the Peace River to spill into the Delta area and Lake Athabasca, causes lake levels to fluctuate through a range of several feet from highs in the summer impoundment period to lows following the outflow of water during the fall and winter months.

Because regulation of the Peace River in British Columbia has resulted in reduced peak flows on that river, there has been a corresponding reduction in the water levels of Lake Athabasca and the Delta. For example, during the period 1960-1971 it has been estimated that the Bennett Dam would have reduced peak summer levels by an average of two feet. The proposed weir would be designed to offset this effect and to preserve the Delta marshland by restoring the natural sequence of ecological processes which existed in the past. With the proposed weir, Lake Athabasca could be expected to rise each summer to an average level of about 689 feet above sea level and to fall to a level of 685 feet each winter as illustrated in Figure 4. By comparison, the long-term recorded average fluctuation was 5.5 feet ranging from a winter minimum of 682.5 to a mid-summer peak of 688.0. In other words, average water level fluctuations with the proposed weir would be somewhat less than before the Bennett Dam was built; winter levels would be a little higher and summer levels would be more stable over a longer period of time.

C. THE EFFECT OF THE PROPOSED CONTROL STRUCTURE ON SASKATCHEWAN INTERESTS

As indicated previously, an assessment of the impact of the proposed weir on Saskatchewan interests has been gleaned in large part from discussions with those Saskatchewan people whom it was felt would be most directly affected. These interests are discussed below under eight major subject headings.

1. Wildlife

There is little wildlife in Saskatchewan affected by the levels of Lake Athabasca. However, the effect of water levels in the Peace-Athabasca Delta is quite a different matter.

Each year, thousands upon thousands of migrating waterfowl are harboured in the Delta. The Delta serves as a nesting and moulting ground and as a giant staging area for spring and fall migrations. The Delta is unique in this regard since it is situated on all four major flyways of the North American continent. Three of these flyways, including the central flyway, pass through the heart of Saskatchewan. While the greatest numbers of waterfowl use the Delta area only as a staging area, a large number remain in the Delta to breed and raise their young. Thus, Saskatchewan has a direct and continuing interest in the management and preservation of these vast flocks of waterfowl which are a valuable resource.

Low water levels in the Delta will not seriously affect the staging habitat for migratory birds. However, there will be a reduction in the total nesting area in the Delta and a resulting downward trend in waterfowl produced there.

The Delta area also provides a place to live for some 45 kinds of mammals, the populations of which are determined by the acreage of appropriate habitat available to them. Available habitat in turn varies with water levels and the extent and duration of yearly fluctuations.

Mammals of particular significant include muskrat, bison and moose. The muskrat has been the mainstay of Delta trappers. Wood Buffalo National Park contains the largest free-roaming herd of bison in North America. Moose are important to local residents for food and as a source of material for clothing and handicrafts.

Saskatchewan may not have a direct interest in these mammals. However, it is recognized that they form a vital component of the native wildlife of the region.

2. Fisheries

While there is some trophy fishing for lake trout in Lake Athabasca, the lake fisheries are primarily important for the commercial fishery. There are two fishery operations: the long-established Crackingstone Fishery and the more recent but growing Fond du Lac or East End Fishery. The catch from both operations is transported to the processing plant at the old Gunnar mine site.

Accurate figures on the number of people involved in the commercial fishery are not available but it was reported that 58 fishing boats are currently in operation. Assuming one or two helpers per boat and allowing for 15 to 20 people employed at the Gunnar plant it has been estimated that there may be 150 persons involved in the commercial fishery operation.

The commercial fish production in 1972 was 827,702 pounds, up slightly from the 817,403 pounds in 1971, but well below the 1,223,516 pounds in 1970, and the long-term average of 1,162,454 pounds per year. The 1972 catch was comprised of about 59 per cent whitefish, 24 per cent lake trout, 9 per cent walleye and 8 per cent pike. The mainstays of the operation are whitefish and trout. However, the walleye is of growing significance primarily due to the high price of $.38 per pound. By comparison whitefish are $.12, pike $.10 and trout $.22.

A clear explanation of the lower-than-average fish production in the past couple of years was not obtained but there seems to these flyways, including the central flyway, pass through the heart of Saskatchewan. While the greatest numbers of waterfowl use the Delta area only as a staging area, a large number remain in the Delta to breed and raise their young. Thus, Saskatchewan has a direct and continuing interest in the management and preservation of these vast flocks of waterfowl which are a valuable resource.

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A clear explanation of the lower-than-average fish production in the past couple of years was not obtained but there seems to be a consensus that it does not relate to lowered lake levels as a result of the Bennett Dam. The legal limit in 1972 was more than double the catch in that year so there is ample room for expanded production. This is not to say that the production of all species could be increased and in fact it has been recommended that steps be taken to reduce the level of exploitation of lake trout. Nor is it correct to say that low lake levels will not have an effect on total production at some point in time. Low levels are known to affect walleye spawning and it has been speculated that low levels may affect the spawning of lake trout and whitefish and this may mean reduced production, perhaps six to ten years after the low levels occur.

The Peace-Athabasca Delta Study established that Richardson Lake in the Delta area is one of the major spawning areas for the walleye population of the western two-thirds of Lake Athabasca. If water levels in the Delta are low, the level of Richardson Lake is low, and the lake freezes to the bottom. This disrupts the annual walleye spawning run and results in a decreased walleye catch over a period of time. It has been established that a significant number of walleyes captured in the Saskatchewan commercial fishery operation spawn in Richardson Lake, so unless a substantial Saskatchewan spawning population exists, which has not been substantiated to this date, it would be reasonable to expect a decline in the Saskatchewan walleye harvest as a result of low levels in the Delta.

With regard to the sport fishery, little is known. There is evidently some potential, particularly along the eastern and northern shores but it is not utilized because of access problems and the inhospitable nature of the lake. Low lake levels apparently limit access to a few small bays where sport fishing has taken place but apart from this and the possible adverse effect on the spawning of sport fish, such as trout, there seems little evidence that low lake levels affect the sport fishery.

To sum up, low lake levels may have some adverse effect on the fisheries of the lake. However, in general there seems to be little concern, either due to a lack of basic information which could only be obtained by detailed biological surveys or because it is felt that other factors have a more significant effect on the fisheries operations.

3. Recreation and Tourism

Lake Athabasca does not have a high potential for water-based recreation and tourism compared to the surrounding lake area. There is believed to be sport fishing potential for trout, pike and grayling but it has been only slightly exploited. There are no fishing outfitters' camps located on Lake Athabasca itself. There is one on the Grease River, a tributary stream, and two on Black Lake, but none of these are affected directly by the water levels of Lake Athabasca.

Several people contacted mentioned that, some time ago, a house boat was stranded for one year by the receding winter level and low water in the succeeding summer, however, it was suggested that the problem could probably have been avoided by a little more caution on the part of the owner. In any case, it is believed that this house boat has been operated on Lake Athabasca for the past three years for recreational purposes by a private company working out of Stony Rapids. While this company has not been shut down, low water levels have caused navigation problems in the bay at Stony Rapids and some bays that used to be fished are apparently inaccessible at times due to low water. The levels this year were satisfactory but it would appear that this operation would derive some benefit from the proposed Delta control structure.

Another recreational aspect that should be noted is the potential for park and preserve-type developments in the sand dunes area on the south shore and at other scenic spots on the east and northeast side of the lake. Prolonged low water levels on the lake might threaten the tourism potential of these areas by spoiling the beauty of the shoreline and perhaps by destroying the spawning grounds of certain species of sport fish.

A summation of the effect of low lake levels on recreation and tourism would have to recognize some effect but to conclude that this effect is slight because of the limited potential due to the large and inhospitable nature of the lake. However, this is an aspect where a narrow focus on the Saskatchewan portion of the lake alone is not justified. It is felt that many Saskatchewan people have an interest in the tourist recreation potential of the Wood Buffalo National Park. which encompasses 80 per cent of the Peace-Athabasca Delta, in the form of sightseeing, photographic tours and a natural desire to see this vast area preserved for future generations. This park, the largest national park in the world, has a wide range of wildlife, and the unique quality of containing a great fresh water delta which is one of the largest, most important waterfowl nesting and staging areas in North America.

4. Navigation and Transportation

The primary means of access to the Lake Athabasca area is by commercial and private aircraft. In this way both supplies and people are transported. However, the communities of Uranium City, Fond du Lac, Camsell Portage and Stony Rapids also rely on barge traffic from Fort McMurray and other points in Alberta, in addition to winter roads, for the transport of heavy freight and supplies to and from those communities.

Water-borne freight to Saskatchewan via Lake Athabasca has averaged more than 30,000 tons in the past ten years. While this is considerably less than the maximum of 100,000 tons recorded in 1956 it can be expected to continue. The tonnage in future will largely depend on the scale of development of the mining industry in northwestern Saskatchewan.

Low water levels affect the passage of water-borne freight on Lake Athabasca by increasing dredging requirements particularly on streams in the Delta area and by increasing the costs for navigational aids at various locations on the lake. Low lake levels also adversely affect docking facilities for tugs, barges and other water craft and reduce the loads that can be carried. It should be borne in mind, however, that low levels do not affect each operation to the same extent or in the same way since there is a significant difference in the draft of the water craft in use. Barges and tugs have a shallow draft and may be less affected than other craft that have a comparably deep draft.

None of the problems that have been identified have been referred to as large or very serious by the people directly involved. They point out that the matters of dredging, navigational aids and modifications to docks are handled by the federal Department of Public Works and the federal Ministry of Transport. In theory, the associated capital and maintenance costs are chargeable to the users but it is understood that to date this has not occurred. An exception to this general situation may be the dock at Gunnar which is privately owned and which is primarily used for the commercial fishery operation.

It was also noted that water hazards exist at all water levels and there seems little concern about possible additional hazards during periods of low water. Also, the hazards and transportation problems on the lake appear to be related more to fluctuations due to natural causes such as wind than to man-made changes in levels.

Regarding docking problems the persons interviewed indicated that it has always been necessary to cope with fluctuating water levels. The usual procedure is to use floating docks which move up and down with lake levels or in the case of permanent, fixed docks, to ramp up or down as the situation requires when unloading or loading barges. In the case of the commercial fishery operation the docking problem associated with low levels appears to be one of inconvenience resulting from the greater effort required and additional time consumed in lifting boxes of freshly caught fish onto the dock.

The evidence of low lake levels is apparently most noticeable to water-borne traffic in the vicinity of Fond du Lac and Stony Rapids. As indicated on Figure 3, both communities are located near the end of a long narrow neck at the eastern end of Lake Athabasca. Low levels result in the increased exposure of rocks and reefs. However, no evidence was presented that the channel to these communities is ever non-navigable during low water level periods, although the captain of one fishing boat mentioned that the level was too low in September, 1970, to get into the docks and additional costs were incurred.

Discussion with officials of Norcanair and Athabasca Airways revealed few serious problems or inconveniences due to low lake levels. They indicated that low levels are of concern to float-equipped aircraft due to the hazard of partially submerged rocks and shoals. However, this hazard exists at all levels, requiring care in landing and take-off. At the same time, it is noteworthy that there is an ever-increasing use of wheel-equipped aircraft and landing strips and most air freight is transported by this means.

Mention should also be made of the feeling that the time is approaching when there may be an all-weather road transportation route to the Lake Athabasca area. If and when this develops it seems reasonable to expect a further decline in the use of the lake for transportation purposes.

In summary, some transportation problems have been identified in connection with low lake levels, but none of these problems seem to be of great concern locally and none have been quantified in monetary terms. It seems the users of transportation facilities have learned to adapt to fluctuating levels and water levels within the historical range can be tolerated with little more than some inconvenience. At the same time it is felt that if the proposed control structure results in any stabilization of lake levels, particularly during the open water period, it may tend to enhance water-based transportation operations somewhat.

5. Mineral Resources and Mining

The only link between low water levels on Lake Athabasca and mining activity is the relationship between that activity and barge traffic on the lake. On the basis of the increased barge operation in the early post-war years due to an upswing in uranium mining, it is felt that future increased mining activity in the Uranium City area and new mines such as the Mokta Limited possibility could result in increased barge traffic for transporting supplies of fuel, building materials, heavy freight and the like. However, this trend may be counteracted to some extent by increased air transport and the possibility of all-weather road access at some future date.

It has been suggested that high lake levels could possibly make prospecting more difficult and conceivably flood some existing claims or adversely affect exploratory programs now under way. This consideration might be related to the proposed control structure to the extent that it would be desirable to ensure that the structure was so designed as to not increase water levels above what they would have been under natural conditions.

6. Shoreline Flooding Problems

Serious high water problems at Lake Athabasca have not occurred in recent years but there is historical evidence that levels have occurred up to four or five feet above the average mid-July level. Such high levels would cause some concern and problems at docks and other shoreline facilities around the lake, particularly during periods of high winds and ice break-up. However, the high water question seems to be of little concern to local people.

It is understood that the proposed Delta control structure would not contribute significantly to peak flood levels. Nevertheless, this question is related to structure design which still has not been finalized.

7. Legal and Jurisdictional

There is no question about the inter-jurisdictional nature of the water resources involved since the biggest piece of the lake and a significant portion of the runoff, forms a large part of Saskatchewan's limited water resources. Any physical or hydrological changes in the Lake Athabasca drainage basin, whether they be in Alberta, British Columbia or the Northwest Territories, will affect this province, if not on inter-jurisdictional streams, then on the resulting affect on Lake Athabasca.

There is at present no interprovincial agreement nor clear cut jurisdictional or legal framework for water management within the drainage basin that ensures consideration of the downstream effects of any developments within the basin. Indeed, there appears to be no formal basis within the basin which requires that one province must consider the possible effects on a neighboring province of building works in that province to serve strictly provincial needs. Each province claims ownership of the waters within her boundaries. The federal government asserts the same rights of ownership on waters in Wood Buffalo National Park and in those waters which drain from the Northwest

Territories into Saskatchewan and thence into Lake Athabasca. This means that all governments affected may have rights of ownership in some of the same water and each may, constitutionally, administer and manage part of the same body of water. In short, there are no precise answers to such questions as to who owns the waters of Lake Athabasca or whether Alberta and Canada could legally build the proposed control structure without Saskatchewan's consent.

Fortunately, these questions are only academic and it is reassuring to realize that a spirit of good will and co-operation has developed on interprovincial water matters involving this province. There can be little hesitation in saying that it is in Saskatchewan's interest to maintain and enhance this relationship so that the control dam, if and when it is built, will be designed, constructed and maintained in such a way that it will provide maximum benefits to all concerned.

The absence of this kind of interprovincial co-operation prior to construction of the Bennett Dam resulted in a situation which necessitates the proposed control structure. Bennett Dam is located on an interprovincial and navigable river. The initial planning studies for the dam should have clearly indicated that it would cause major changes in the natural flow pattern of the Peace River, thereby affecting the rights and interests of people and jurisdictions outside the province of British Columbia. British Columbia Hydro should have recognized an obligation to these outside parties and acted accordingly.

Saskatchewan believes that a thorough assessment of downstream effects followed by agreement by all the parties concerned for implementing proper environmental management measures must be prerequisite to proposed major developments such as the Bennett Dam.

The administrative details relating to authorization and licensing of the proposed control structure on the Riviere des Rochers have yet to be identified and resolved. Since the structure will be located in Alberta, it will have to be licensed under The Water Resources Act of Alberta. However, because it will affect water levels of a body of water in Saskatchewan, it will also require the approval of Saskatchewan authorities. In addition, there will be a need to obtain approval under certain federal acts and regulations.

8. On the Possibility of Future Developments in the Basin

If future large storage or diversion possibilities within the basin could be foreseen it would be prudent to assess the implications of such developments on Lake Athabasca before endorsing the construction of the proposed control structure on the Riviere des Rochers. At the very least it would seem desirable to carefully consider the design of that structure to ensure that it would provide for the effect of such developments and to ensure that the building of the control structure would not conflict with future developments. However, there are definitely no plans or firm proposals for any major developments in the Saskatchewan portion of the basin in the foreseeable future. While a possible hydro development on the Fond du Lac at Black Lake is being assessed there are no plans to proceed with that development. In any case, as presently proposed, it would not involve significant storage and the effect on flows and on Lake Athabasca levels would be so slight as to be of little or no concern with regard to the current assessment of the proposed Peace-Athabasca control structure.

Three diversion possibilities out of the Lake Athabasca drainage basin in Saskatchewan were assessed in a preliminary way in the recently completed Saskatchewan-Nelson Basin Study. First there is the potential for a series of low dams on the Fond du Lac and a scheme to pump water upstream into Wollaston Lake from which it would flow by gravity to the Churchill River system. Costs of such a scheme would be very high and the possibility that it would ever proceed are remote, except perhaps for a small portion of the scheme which would be a gravity diversion. A second possibility is a gravity diversion of some of the water flowing into Cree Lake to the Churchill River. It is also possible to divert the Clearwater River into the headwaters of the Churchill. While the latter two schemes are more feasible from an engineering and economic point of view it seems very unlikely that they will ever be seriously considered unless perhaps it is some day considered desirable to divert some of the Churchill waters into the Saskatchewan River system to offset increased usage of the Saskatchewan River waters in this province.

It should also be noted at this point that if the day comes that one of them is considered further it would have to be carefully assessed in terms of environmental effects, not only on the immediate area, but on the receiving stream and downstream areas including Lake Athabasca. However, in view of the remoteness of these schemes in the foreseeable future there seems little justification for considering them further when assessing the Saskatchewan interest in the proposed Peace-Athabasca control structure.

As for the likelihood of future water development projects in the portion of the Lake Athabasca drainage basin which lies in British Columiba, Alberta or the Northwest Territories there is only one known significant development under consideration at this time, that being the proposed diversion of a portion of the McGregor River, a tributary of the Fraser River, into the upper Peace River. It is understood that this diversion would increase the flow volume of the Peace River by about 18 per cent. This would probably result in some improvement in the water level situation on Lake Athabasca and will have to be considered in the design of the proposed Peace-Athabasca control structure.

D. SASKATCHEWAN'S POSITION

In consideration of the factors discussed in the preceding pages it is necessary to ask three questions: Do low lake levels adversely affect Saskatchewan interests and to what extent? Are low levels likely to be more severe and more frequent as a result of the Bennett Dam than under natural conditions? Will the proposed control structure restore or at least improve the water level situation?

Considering the first question it appears that Saskatchewan interests are affected somewhat through adverse effects on wildlife, water-borne transportation, fisheries and tourism. However, these effects do not appear to be large or quantifiable in monetary terms. Fluctuations in levels of the lake have always occurred and people have learned to live with these conditions. With the possible exception of the adverse effect of low levels on fish spawning, which has not been fully documented, the adverse effects of low levels can be circumvented.

On the effect of the Bennett Dam there is no question that levels were several feet lower than they would have been under natural conditions during the initial filling of Williston Lake from 1968 to 1971. The Peace-Athabasca Delta Study has also established that the regulatory effect of the Bennett Dam will cause a permanent reduction in lake levels on a long-term basis and these lowered levels will occur somewhat more frequently than under natural conditions. However, the probability of levels at any time being lower than has ever occurred historically seems rather remote and it is reasonable to expect that the direct interests of Saskatchewan could be adapted to the new regime. Even those species of fish which spawn in the Saskatchewan portion of the lake and which may be affected by low levels could likely adjust to the new regime over a period of time.

Concerning the question of the benefit from the proposed control dam some doubts were expressed by local people that it would do any good but the consensus of opinion is that it should be built, and if it helps to stabilize lake levels it will be a good thing. Studies have confirmed that the proposed structure will offset, to a substantial degree, the effect of the Bennett Dam but it will not be possible to restore conditions precisely to the historical pattern. Peak summer levels will be about the same, but the duration of the summer peaks will be more prolonged and winter lows will be higher. In short, the degree of fluctuations will be somewhat reduced which could be construed, in general, as an additional Saskatchewan benefit. At the same time, it is felt that there is some uncertainty about the actual effects of the proposed structure. This suggests the possibility of needing future modifications or perhaps consideration in the future of a better control than the fixed weir alone.

With these facts in mind and pending receipt of views of the public at public hearings scheduled for late September, 1973, a Saskatchewan position has been developed. It consists of the following main points:

1. Saskatchewan endorses the proposed control structure on the Riviere des Rochers as the only feasible alternative to restore natural water levels on Lake Athabasca and in the Peace-Athabasca Delta.
2. Saskatchewan wishes to participate in the co-ordination of design, construction and resource monitoring programs associated with the proposed structure to ensure that the structure will best meet Saskatchewan needs, that it will be properly constructed in accordance with Saskatchewan requirements, and so that Saskatchewan will be informed of the effects of the new structure and have access to all new resource data which is collected.
3. Saskatchewan is prepared to contribute to the costs of building the proposed control structure. However, Saskatchewan's agreement to participate in financing the control structure should in no way be construed as absolving the party that caused the problem, namely, British Columbia Hydro. Saskatchewan believes British Columbia Hydro has a responsibility to the people and jurisdictions adversely affected by the building of the Bennett Dam. Saskatchewan believes British Columbia will eventually recognize this responsibility and will make appropriate restitution for the cost of the remedial works required.
4. Considering only the direct benefits to be derived by Saskatchewan from the proposed structure, it is doubtful

if Saskatchewan financial participation can be justified. However, interprovincial water resources are involved and it is recognized that Saskatchewan participation will have a number of benefits, not the least of which is the maintenance of the spirit of good will and co-operation that has developed on interprovincial water matters involving this province. Saskatchewan believes that her people want to take part in the process of restoring and preserving the biological community of one of the great delta areas of the world.

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Mr. Ted Jonasson — Department of Northern Saskatchewan Conservation Officer, La Ronge.

Mr. Chick Terry — Department of Northern Saskatchewan Conservation Officer, Stony Rapids.

Camp Operators — Moreberg Camps, Black Lake.

Mr. Ahmed Hashem — Captain of house boat on Lake Athabasca, Stony Rapids.

Mr. Mike Nemes — Part owner of house boat on Lake Athabasca, Stony Rapids.

Mr. P. Martel — Manager, Hudson Bay Company store in Fond du Lac.

Mr. Whitton — Manager, Northern Transportation Company, Uranium City.

Mr. James Scott — Captain of fishing boat Aggy May, Uranium City.

Mr. Fritz De Foysa — Resident Geologist, Department of Mineral Resources, Uranium City.

Mr. Grant Zachow — Town Foreman, Uranium City.

Mr. Al Hemingson — Pilot and prospector, Uranium City.

Mr. Harold Strom — Department of Natural Resources, Prince Albert.

Mr. Larry Hunter — Co-op Fisheries, Prince Albert.

Mr. Harry Davinsky — Canada Ministry of Transport, Marine Services, Hay River

Mr. Peter Livingston — Canada Department of Public Works, Edmonton.

Mr. Robinson — Traffic Manager, Northern Transportation Company, Edmonton.

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Mr. George Couldwell — Director, Fisheries and Wildlife, Department of Natural Resources, Regina.

Mr. Merv Atton — Research Supervisor, Fisheries, Department of Natural Resources, Saskatoon.

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Mr. Ron Johnson — Superintendent of Fisheries, Department of Natural Resources, Prince Albert.

Mr. Jim Clouthier — Superintendent of Resource Development, Department of Northern Saskatchewan, Prince Albert.

Mr. Dave Frenette — Biology Department, University of Saskatchewan, Saskatoon.

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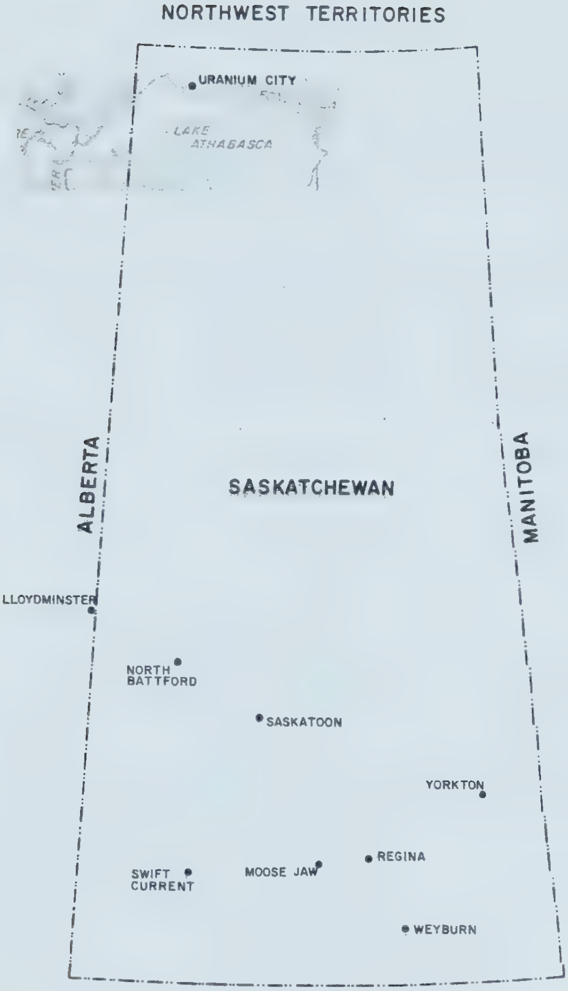
Mr. Floyd Glass — Athabasca Airways, Prince Albert.

Mr. Brian Hill — Director, Policy and Planning Branch, Department of Northern Saskatchewan, La Ronge.

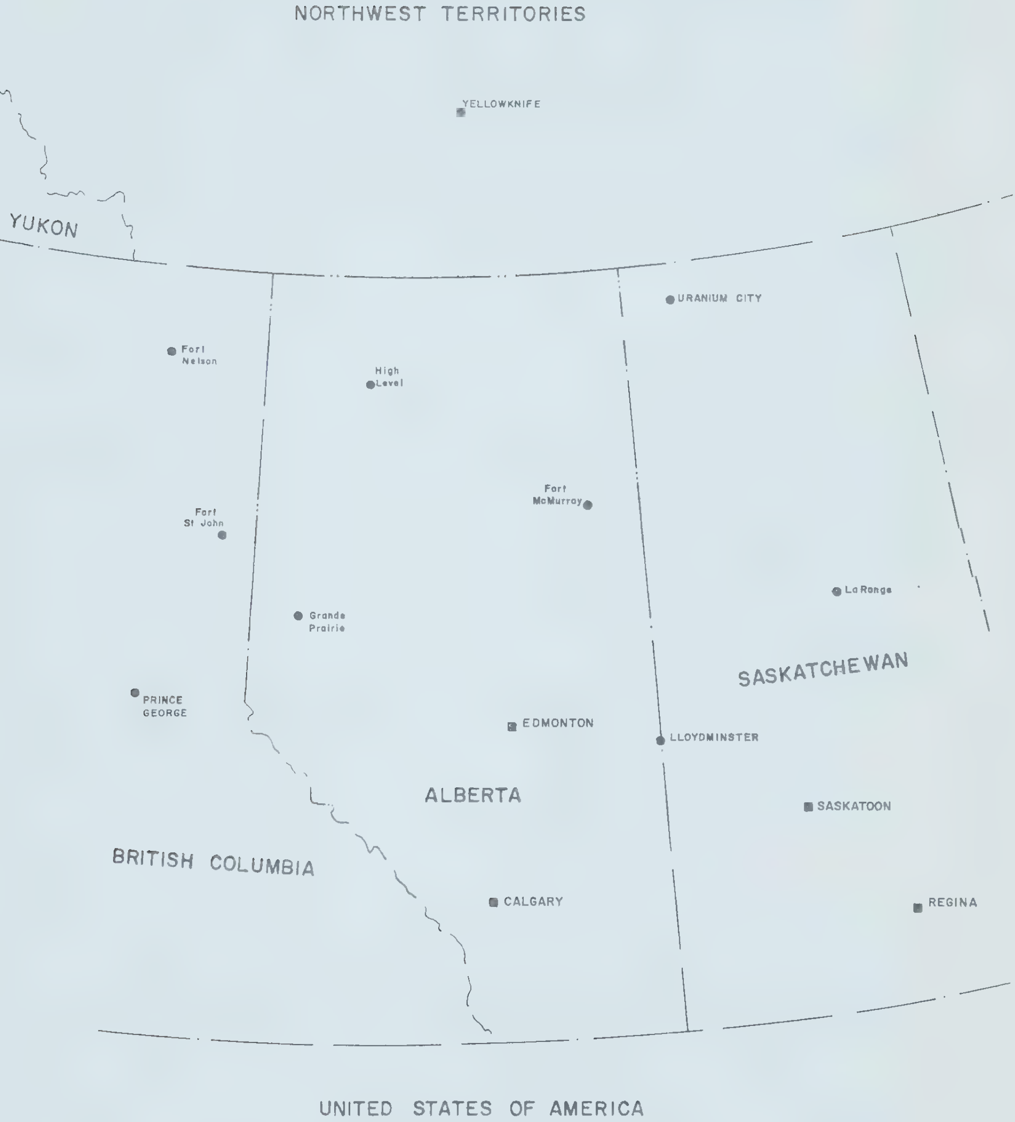
Mr. Gordon Koshinsky - Policy and Planning Branch, Department of Northern Saskatchewan, La Ronge.

Professor Stan Rowe — Chairman, Saskatchewan Environmental Advisory Council, Department of Plant Ecology, University of Saskatchewan, Saskatoon.



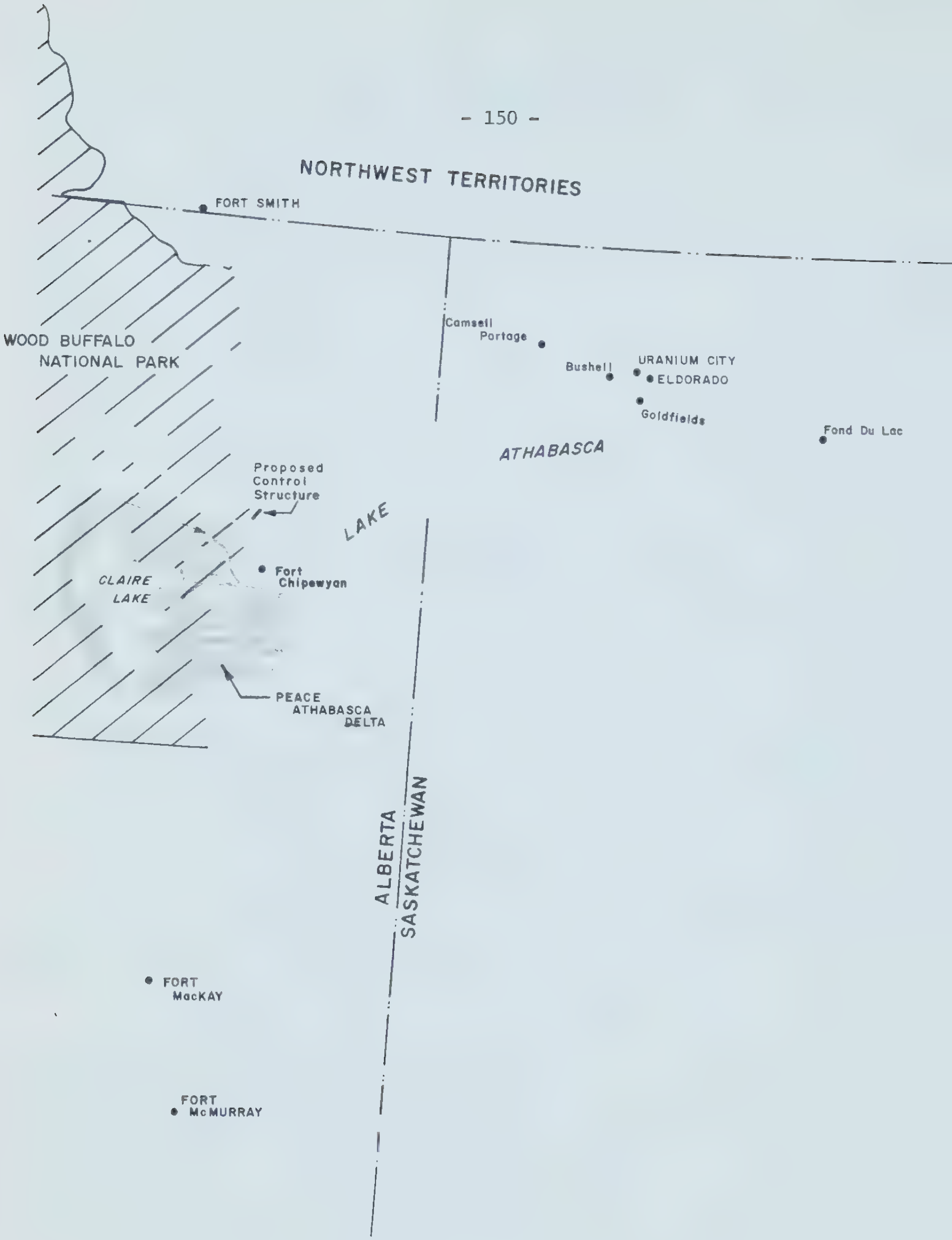
KEY MAP
SHOWING
PRIMARY ZONE
OF
INTEREST

FIGURE I



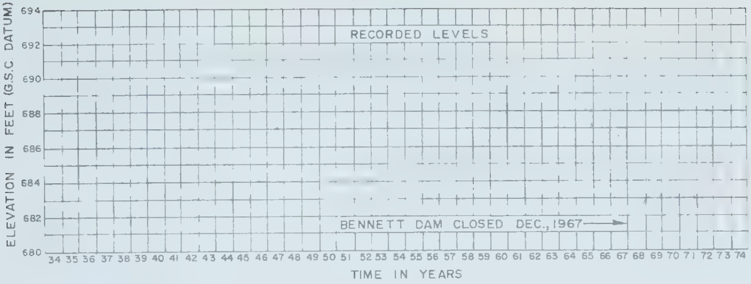
KEY MAP
OF
LAKE ATHABASCA
DRAINAGE AREA

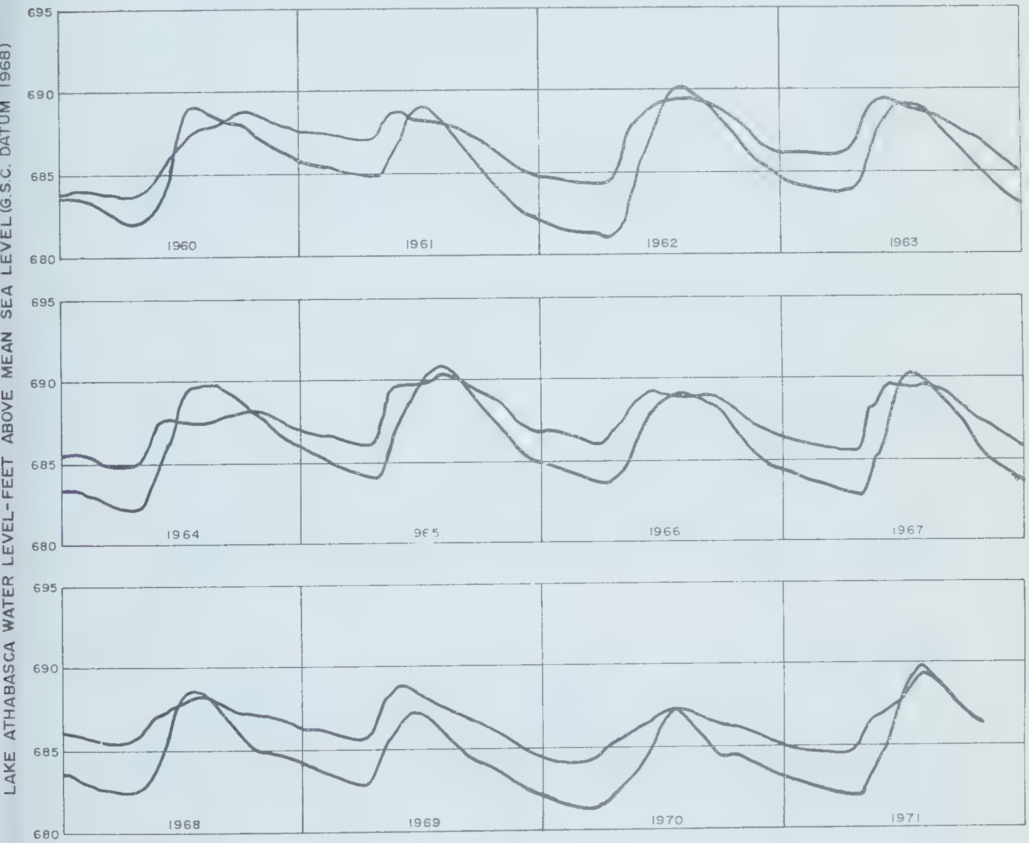
FIGURE 2



KEY MAP
OF
LAKE ATHABASCA
AND THE
DELTA

F





LEGEND

RECORDED AND ESTIMATED LAKE LEVELS ASSUMING NO EFFECT BY BENNETT DAM...............

RECORDED AND ESTIMATED LAKE LEVELS ASSUMING FULL OPERATION OF THE BENNETT DAM....

ESTIMATED LAKE LEVEL ASSUMING FULL OPERATION OF THE BENNETT DAM SINCE 1960
AND THE PROPOSED CONTROL STRUCTURE..

LAKE ATHABASCA HYDROGRAPHS
SHOWING THE EFFECTS OF
THE BENNETT DAM
AND THE
PROPOSED CONTROL STRUCTURE

FIGURE 4

[LUNCH BREAK]

QUESTIONING

MR. S. R. BLACKWELL

Are there any questions that anyone would like to ask with regard to the Alberta or Saskatchewan papers which were presented just before lunch?

MR. R. JONES

My name is Ray Jones and I work for the Native Society here in Uranium City. I'd like to direct this to Mr. Forbes. He mentioned the water level this morning; he said there was a difference of 3 feet. Here in Lake Athabasca there was approximately 13 to 15 feet difference in the water level. Maybe he could answer this. He said there was a difference in the water level of 3 feet.

MR. F. J. FORBES

The figures I was quoting referred to the level in May of about 685 and then the peak of about 688. Now, it is true that if you go to the winter lows you can get more of a range; it could drop down to 681, 682 and even lower than that. Where was the measurement taken for the 13 feet?

MR. R. JONES

That was right here at Bushell Inlet, at the Erickson Inlet. This happened since the Bennett Dam was constructed. All of a sudden the water went down.

MR. F. J. FORBES

And are you sure that it is 13 feet?

MR. R. JONES

The estimate was 13 to 15 feet, so I was kind of confused at the figures you gave.

MR. F. J. FORBES

Well, it sounds to me that that would be a little on the high side. I don't think we have had anything like that, that much. We can go back and pull out the levels for you. Grant?

MR. G. C. MITCHELL

I was wondering what the difference was between the historic high and historic low levels.

MR. F. J. FORBES

The historic high is between 693 and 694, and then you can go down in the winter to levels around 680, or under ice conditions they have got them lower than 680. So that might be the case where you would get 13 feet.

MR. R. JONES

I see. You mentioned also they may construct an underwater weir, and I think that a lot of the people here don't know what this underwater weir is.

MR. F. J. FORBES

I'll put a little sketch on the blackboard. [Inaudible while at blackboard] We would be closing off the Riviere des Rochers. The Quatre Fourches only carries ten percent of the flow so it wouldn't affect operation of this dam. We would also close the Coupe in here.

Now, for the type of structure, if you can visualize that we just cut with a knife right across the river, this would be the section and the water would be going this way. What we would do would be to fill up the bottom here with rock so we would cut down on the size of the channel and therefore reduce the outflow. The shape of the dam would be something like that— this would be the channel bottom and then the water would flow across something like that. This would be all heavy rocks in here. Does that answer your question, Ray?

MR. R. JONES

That answers it. Actually this is going to be a sort of diversion of water. I wonder if it is going to have any effect on the Slave River, the river that goes into the Northwest Territories. A young student here mentioned that it may affect the downriver system. What happened in the past right after the Bennett Dam was constructed was that there were slides at Fort Smith. I think that a woman got killed and a home went down. This was because the water went down and naturally there were slide-ins.

MR. F. J. FORBES

I am not familiar with the bank failures.

MR. R. JONES

Fort Smith is pretty well on the river bank and since they constructed the Bennett Dam the water went down, so naturally they had slides and people got killed on that.

MR. F. J. FORBES

I am not familiar with that.

MR. R. JONES

It shows on your map here on my right here, Riviere des Rochers— it is directly north, Fort Smith is on the boundary.

MR. F. J. FORBES

I'm familiar with the location of Fort Smith; I'm not familiar with the slides.

MR. R. JONES

I see.

MR. F. J. FORBES

I'd have to check into this and see just what the cause of it was. Normally the water goes down and you wouldn't anticipate . . . generally you get the slides when you get the water coming up and you get a saturated bank. But in answer to your other question in terms of the effects on the Slave River, it wouldn't have any significant effect on the water level or the depth of water in the Slave River because we are putting it back to natural. When we put this weir in, as Mr. Durrant mentioned this morning, it will drop the level of Great Slave Lake about a tenth of a foot.

MR. R. JONES

I wonder what are the side effects if you are going to construct this weir at the Riviere des Rochers. A lot of dams have been constructed and there is silt and everything, there is obstruction and the water level has gone up. I wonder what side effects this would have around the delta.

MR. F. J. FORBES

Well, the one side effect— we can't get the full amplitude in terms of the flooding so you would still get some change in the vegetation in the delta until the delta assumes a new ecological balance. In terms of, say, the silting there will be some degradation or erosion of channels. We can't predict fully just what will happen there. In general we think that these will be things that will occur over a long time and will not be serious but just to make sure that we understand these things and watch them, we are proposing that we monitor the effects of the weir. And that would mean then that we would continue to take water level observations, samples, to determine the silt load and if there are changes in the channels, etc.

MR. R. JONES

Also, you said that this would affect Wood Buffalo National Park, but I see this was just a portion, or not even half of the Wood Buffalo Park, just around the Peace-Athabasca delta. Is that it?

MR. F. J. FORBES

You are referring to the other part of—

MR. R. JONES

Yes, I'm referring to the whole Wood Buffalo Park.

MR. F. J. FORBES

Tuesday we had a fellow stand up and say, "Water is the boss." In terms of the delta, the only effects for the Park will be where the water levels of Lake Athabasca influence the water levels. Beyond that, throughout the Park there would be no effects from what we would do.

MR. R. JONES

You also mentioned that it will cause a lot of changes in the delta; about 300,000 acres will become overgrown with shrubs and trees and so forth. How high exactly is this going to be— two or three feet or is this back up to the normal, like it was in 1970?

MR. F. J. FORBES

Are you referring to the—

MR. R. JONES

The water level.

MR. F. J. FORBES

It would come back to what it was before 1968. The situation is, in terms of the grass meadows, that basically the two types are the *Calamagrostis* and the sedge and these are located on a vertical range of two feet in the delta so that if you cannot get a full fluctuation or full flooding then the upper range of the grasses will be replaced by willows to start with and eventually trees. This process has been going on for the last four years and we have willows now which are six and seven feet tall, simply because on the upper part of the range it dries out and the willows can grow. Does that answer—

MR. R. JONES

Yes, that's good enough. I'll probably present a brief, we have time until November sometime, so that is what I'll do.

I'd like to direct this at Mr. Mitchell. You said this morning "about 11,000 cfs". I don't know what this is— to me this is something new.

MR. G. C. MITCHELL

It is "cubic feet per second" and it is just a measurement of water flows. I think the numbers aren't all that important but the comparison is important, like 11,000 in one case and 70 and 30,000 in the other one.

MR. R. JONES

That's all. Thank you.

MR. S. R. BLACKWELL

Are there any more questions? We have some questions from the panel.

DR. S. ROWE

I think we need to clarify one thing that came out this morning in Dennis's question, and that is whether or not at these hearings we're making a decision between a fixed weir at a certain place on the Rochers River or no control structure at all (that, I think, is what some people think the question is), or whether in fact the question is should we be trying to make choices between different kinds of control structures perhaps at different places. As you know, the reports do mention the possibilities for submerged weirs or for constrictions in the rivers at various places or for gated control structures, that is structures where you can open and shut the gates— hold the water in or let it go.

I would like to direct this question to Stu Smith just for his comment, as to what it is exactly that we are discussing at these hearings.

DR. S. B. SMITH

The question that Dr. Rowe is raising I can only answer in terms of what I understand as a biologist. As I understand, what the engineers are proposing to restore water levels will result in a gain from the present situation, but will still be about 25 percent less productivity than before 1968. I believe that what the report says, and I am expressing a personal opinion, is that the Rochers weir offers the best base line control for putting the water back as well as they can with that structure, but we still have options open mentioned in the report.

The report mentions little control structures in perched lakes, and it mentions ice dams that can be artificially built. So all these things as far as I can understand could still be added once the Rochers dam is in, but some structure like the Rochers dam is very necessary to provide a level, and then people can work at that level.

I think that the engineers would have to comment, but that is the way that I interpret the report— that if people who live on the resources of the delta and the lakeshore region want better than the Rochers dam can give them, then it is up to them to ask for it and I suppose the engineers can then say whether it can be done or not. So in answer to Dr. Rowe's question I think that clearly the big technical committee report still leaves some options open for additional control measures beyond the Rochers dam. At least that is the way that I interpret it.

DR. S. ROWE

Yes, I understand that this will establish a certain level and then it's possible to do other engineering things around it such as ice dams and so on that would flood other parts— perhaps we want to raise the levels elsewhere. But I suppose the question is are we considering alternatives to that fixed weir on the Rochers River? For example, might not some sort of a dam with gates that you could open up on the Slave River be ever better as a control structure, and then you could do other engineering feats around that.

DR. S. B. SMITH

Well, I'll leave that to the engineers to answer. But I would like to say that I understand from the explanations offered to me that originally I might have argued for a gated structure but as a biologist who has been involved with the delta since 1966, I am satisfied in my own mind, honestly, that the remedy suggested provides the best immediate response for water to come back on the delta and we can still go a long way beyond that with Gerry Townsend's ideas on managing small muskrat marshes and so on and even the former director's idea of these cryopile dams— all these kinds of things are still possible because if you give the engineers enough money they can do anything you want. I am personally satisfied, Dr. Rowe, that the technical committee has placed before government the best immediate solution to the problem.

MR. S. R. BLACKWELL

This question was dealt with quite extensively this morning. Do you want to add anything to that, Frank?

MR. F. J. FORBES

I think I'll add just a couple of points. The problem we were faced with, Dr. Rowe, was trying to meet a number of demands in putting back the water levels. First, 80 percent of the delta is in Wood Buffalo National Park and in order to meet the Park's needs the regime must be put back to natural. Then, we try to recognize the needs of the local people in terms of the trapping and we said, okay, if we put the water levels back to what they were in 1968 this would go a long way to restoring the muskrat populations. In addition to that, as Mr. Townsend explained this morning, if you want to improve muskrat population over and above what you would get under natural conditions, you would go into muskrat farming, and we made recommendations in the report that technical and financial assistance be made in areas of the delta for this. Also in terms of the fishing, we identified that there are potential problems for walleye spawning and that this be monitored and if necessary remedial action taken there.

So what it comes down to then is that we suggested that the minimum the government should do at this time would be to put the weir in and bring the levels back to normal with the idea that other steps could be taken. In regard to the Slave site and the structures we looked at in terms of the Slave, there were problems on the Slave with ice, with navigation, and with a fishway. In assessing these problems it appeared to us that we could get just as good a result with the weir on the Riviere des Rochers.

Does that answer your question? We tried to document this quite carefully in the Summary Report. We have listed all the factors which we looked at in the selection and evaluation of the different sites. It's summarized in a two-page sheet in the book if you want to look at it again.

MR. G. KOSHINSKY

I would like to address a question to Mr. Townsend. I was wondering to what extent, if any, water quality considerations entered into the evaluation of alternatives, perhaps between the site under most active discussion and the Slave River site. I am thinking particularly of the relative differences that might exist in terms of nutrient loading to the delta lakes as regards the change in the primary source of the water being no longer the Peace River but dependent on the Athabasca River and the Fond du Lac system from the east. I think there is quite a bit of discussion in the reports about total dissolved solids and siltation effects; you might have a comment or two about that. I was wondering specifically if there was any attention to the nutrient question.

MR. G. H. TOWNSEND

On page 105 of the Technical Report there is a map indicating the average total dissolved solids that occur in the various streams and rivers and in the lakes adjacent to the delta. One of the problems considered was the necessity to have the water from Lake Athabasca and the rivers back up into the delta periodically, because waters flowing directly into Lake Claire from the Birch River, the McIvor River and some of the other rivers were very high in total dissolved solids. It was anticipated that over a long term, if this flushing action from

Lake Athabasca or these other rivers did not occur, there would be a gradual buildup of solids in Lake Claire and Lake Mamawi to a level which might affect the plant composition or some of the fish species.

We looked at the total dissolved solid concentrations in the Peace River and in the Athabasca River and compared these with the concentrations flowing into Lake Claire from the direct sources. On the Athabasca River the average total dissolved solids is about 216 parts per million and in the Peace, 125. This can be compared with 360 and 240 that flow into Lake Claire directly. Prior to the Bennett Dam a good portion of the water which flushed the delta periodically came from the Peace River. We don't know what percentage but both the Athabasca and the Peace Rivers contributed to flushing the delta. With the Rochers weir in effect we anticipate that a higher percentage of the water required for flushing the delta will come from the Athabasca River, which does have a higher total dissolved solid content. But we did not believe that this was that much higher so as to negate the flushing effects and we believe at this stage that it would be sufficient to keep the total concentration in Lake Claire from building to an excessive level.

In the technical appendices we go into a little more detail on some of the nutrient loads and some of the toxic chemicals and came to the conclusion that we didn't have an awful lot of information, that these elements should be monitored and we are preparing to continue to monitor for specific elements such as boron and some of the possible toxic elements.

MR. S. R. BLACKWELL

I might mention that on page 98 of this report there is a picture of what this proposed rock-fill dam would look like. This was the question that Ray Jones raised.

I would now like to call upon Christina Adam to present her brief.

MRS. C. ADAM [Translated from Chipewyan]

You are talking about putting a dam at the Rochers River. The reason that the water is going down is because the earth is going up, and that is nature. Maybe if the earth will go down the water will come up again. Even in the creek for about the last ten years now there is hardly any water. Maybe we won't even have any water here in Uranium City pretty soon. It's pretty well just about dried up. Even if they put a dam out there in Rochers River, not all the people are going to benefit from it.

I am 71 years old now and have lived in this area all my life. I know what is going on, too. Ever since the water has gone down around this area there is more disease going around too. Even if you put the dam there, I don't think it will be much help too long. The white people get their hands into everything, even in Uranium City, but they have got to know that nature looks after itself. That's all I will say for now.

QUESTIONING BY THE PANEL

MR. S. R. BLACKWELL

Thank you, Mrs. Adam. Does any of the members of the panel have any questions that he would like to ask Mrs. Adam?

MR. G. KOSHINSKY

I would ask Mrs. Adam what diseases particularly she has noticed the increase in, and in what locations.

MRS. C. ADAM

The water is going down like that. I don't figure it is from the dam, it is like that all over the place. You go some place out in the bush, all the water levels are the same, unless the earth lowers down again and there will be lots of water again.

What I mean by disease is, the water is pretty low and kids in the summertime get diarrheas and things like that, going around lately since the water has been going down.

MR. S. R. BLACKWELL

Are there any other questions? Then I think we will move on to the next brief. I would now like to call on Fred Heal to present a brief on behalf of the Saskatchewan Environmental Advisory Council. I might mention that the person who was going to present this brief could not be here so Fred Heal is going to read it into the record.

MR. F. A. HEAL

The Environmental Advisory Council (EAC) of the Province of Saskatchewan, in presenting this brief, endorses the recommendation by the Peace-Athabasca Delta Project Group that a control structure be constructed on the Riviere des Rochers to restore water levels in Athabasca Lake and the delta as near as possible to their historical condition.

The Council feels that along with effects on our overall provincial population and economy, the life styles of those who choose to live in this northern area are greatly affected by the biological resources of the delta. Evidence concerning the human habitation of the delta strongly points to maximizing social and economic benefits through increased use of delta resources by local residents. The increased use of these resources cannot likely occur without restoration of water levels in the area.

The EAC considers the effects on wildlife in the area of utmost concern. To Saskatchewan, the management and preservation of waterfowl flocks reared in the delta is most important. A downward trend in delta waterfowl production could have considerable effect on the economy of Saskatchewan by reducing recreation and tourism potential. The muskrat, a mainstay of delta trappers, does not have as great an effect on Saskatchewan economy as waterfowl, but we consider it, along with other mammals of the area, a vital and integral part of the region's native wildlife. Regarding fisheries, it is most probable Saskatchewan will be adversely affected by low water levels in Richardson Lake, should the low level of Lake Athabasca be maintained. Disruption of the walleye's annual spawning run will result in a lower population of that species available to Saskatchewan fishermen.

As Canadians, we in Saskatchewan have an immediate and long-range interest in the potential of Wood Buffalo National Park, both as a significant tourist recreational area and as an irreplaceable wetlands preserve.

We of the EAC remind the governments concerned with this proposal of the need to communicate with and understand the wants and needs of the native people of the area. The lack of total understanding and appreciation of their rights and wishes could be as undesirable as the lack of interprovincial cooperation on the part of the British Columbia government prior to construction of the Bennett Dam.

We may criticize another government for the apparent lack of initial planning studies, and the disregard for the rights and interests of people and powers beyond its jurisdiction. However, the Council cautions the governments involved in the construction of the Riviere des Rochers control structure to learn from this lesson so that, in their hurry to correct the first mistake, these governments do not make a second mistake. In particular, the EAC suggest consideration be given to alternatives to the submerged weir, such as a gated structure. Since a submerged weir will not restore peak flood levels, it will alter the salinity regime and reduce the vertical range of sedge and *Calamagrostis* communities by 40 percent to 45 percent. Also, the EAC recommends that the long-term effects of a control structure on the Riviere des Rochers be given adequate consideration.

We are pleased that Saskatchewan will participate in the design, construction, monitoring and financing of the control structure. We agree that a spirit of goodwill and cooperation is necessary where interprovincial waters are involved.

QUESTIONING

MR. S. R. BLACKWELL

Thank you, Fred. I'm going to turn things around a little bit here and permit questions on this and ask Stan Rowe, who is on the panel, to try to answer any questions that may come up.

I would like to lead off, if I may. There is a comment made about a downward trend in the waterfowl population having a great effect on the Saskatchewan economy and I wondered if you have any feeling for the percentage of the waterfowl hunted in Saskatchewan that are raised in the Peace-Athabasca delta?

DR. S. ROWE

I'm afraid I don't, Stan. One of the Environmental Advisory Council members, Dennis Fisher, who helped us prepare that brief, undoubtedly has that kind of information and that was why that was put in. Perhaps there is someone from the Canadian Wildlife Service here who is familiar with flyways and the ways ducks move between the delta and southern Saskatchewan, anyway, who could give us some insight into that.

MR. G. H. TOWNSEND

Mr. Chairman, in the waterfowl appendices I believe there is information on banded birds moving to the different areas. If I could perhaps have ten minutes to look this up, maybe I could answer the question then.

MR. S. R. BLACKWELL

Another question that I had pertained to the remark that reduction in the walleye spawning run to Richardson Lake will significantly affect Saskatchewan. I would like to ask Ron Johnson if he could make some comments with regard to this.

MR. R. P. JOHNSON

For some of you who may not know, walleye and pickerel are the same fish. The fishermen call them pickerel, the scientist calls them walleye. About 135,000 pounds of walleye are harvested by the Saskatchewan commercial fishery. Perhaps 7,000 pounds of these come from the Fond du Lac area, the rest are caught on the south shore around the William River area. We know from tags that were put on walleyes in Alberta and caught by the fishermen near William River that most of the walleyes that are caught in Saskatchewan go to the delta area, Richardson Lake, to spawn and then each year they come back. So if the spawning areas for the walleye in Richardson Lake and the delta are destroyed, Saskatchewan will lose this particular part of the walleyes or pickerel that are harvested. There doesn't seem to be much doubt that we are directly involved with the walleyes in this respect.

MR. P. J. DOWLING

Mr. Chairman, I would like to ask a question. I presume there are people in the audience here today who earn their living from trapping. My question is actually directed to them. I would like to know from them whether in fact they feel that the establishment of the dam that we have spoken of on the Riviere des Rochers will in fact help their way of life, will in fact, in their opinion, increase their economic conditions?

MR. E. ADAMS [Translated from Chipewyan]

If the water goes up it sure would help us. When the water is low it kills everything, the wildlife and the fish and such.

MR. P. J. DOWLING

Do you feel that your opinion is the same opinion that's held by other people in the various communities around the east end of Lake Athabasca?

MR. E. ADAMS

I have talked to a few people and the people are agreed with it, especially the older people from the old times. They noticed that there was a lot of change when the water went down.

MR. G. H. TOWNSEND

The question asked a short time ago was how important was the delta in the east end of Lake Athabasca to the hunter in Saskatchewan. Ducks Unlimited analyzed the banding recoveries from birds banded on the delta. Forty percent of the ducks and geese in Canada were taken in Saskatchewan.

MR. S. R. BLACKWELL

Does anyone want to make any comments at all?

MR. R. JONES

The people here are concerned about the water level. I don't think the federal government wants to take any responsibility, the same thing with the Saskatchewan government, also the Alberta government. I don't see the B.C. people here. The Bennett Dam is actually its dam. They control the strings on the water and they know that it creates some environmental problems here on the Peace-Athabasca delta. I don't think that constructing a weir will solve this. I think what we really got to get is the Bennett Dam, maybe open that dam to half its capacity. The water level here, I think, for the fishermen in Lake Athabasca, wouldn't affect them too much, but it really would affect the people at Fort Chipewyan for the waterfowl, muskrats and game.

MR. S. R. BLACKWELL

There are a couple of gentlemen here from B.C. Hydro. Would either of you gentlemen care to make any remark or comment at this time?

MR. R. STRILIVE

Gentlemen, I am one of the two people from B.C. Hydro and I am very concerned and interested in your comments. As a lawyer representing a defendant, I cannot, nor can B.C. Hydro, participate in a debate in a forum that is not the Supreme Court of British Columbia. We did not choose the forum, we did not choose to be defendants and I believe the present question is the question that goes beyond the litigation and is more properly directed to the B.C. government rather than B.C. Hydro.

MR. R. JONES

What I am really saying here is: the provinces are here, who does really control the water? It appears that the provinces and the federal government have no say on this water in this country here. I am directing this at the panel.

MR. S. R. BLACKWELL

I would like to respond to this question by asking Frank Forbes if he would mind making some comments on this because the question was looked into in some depth in the Peace-Athabasca delta study, the question of responsibility and legal and jurisdictional problems.

MR. F. J. FORBES

I guess I could start with a statement that this is a very complex problem that you are raising here, Ray. In the study we conducted what we called a legal framework study. Perhaps an easier way to give you a positive answer here is that Mr. Davis, who is the Minister for Environment Canada, has made the statement that he plans to bill B.C. for the cost of the study and the cost of the remedial works. Alberta and Saskatchewan officials have made statements here today that they support that B.C. should take responsibility for this.

Going beyond that I think it becomes a process for our political masters and for our lawyers to straighten out. In the study we identify that the Bennett Dam certainly was responsible in this case, and I think to go into all the details of it wouldn't really add much other than that this is the approach that is being taken and there will be discussions with B.C. coming in the future. Ray, does that help to answer the question you were— ?

MR. R. JONES

In a way, but these gentlemen here, especially the panel and other guests of the Province, should bring down their language to the local people. You are using a lot of big words I don't think the people really understand, or even the interpreter.

MR. F. J. FORBES

If we have been doing that, our apologies. I'm sorry.

[COFFEE BREAK]

OPEN DISCUSSION PERIOD

MR. S. R. BLACKWELL

Does anyone have anything more that he would like to say?

MR. F. de ZOYSA

My name is Fritz de Zoysa and I am from Uranium City. Since the effect of the proposed weir on the fauna and flora is not all that clear, would it not be better to raise the level of the weir to the suggested height for a period of a few years? Raising the level of the weir in stages will reduce ecological disturbance and damage to a minimum. I would like to direct this question to the panel.

MR. S. R. BLACKWELL

Would you like to answer that, Gerry or Stu?

MR. G. H. TOWNSEND

The weir is intended to reduce to a minimum the ecological changes that have occurred as a result of the Bennett Dam. There is perhaps not 100 percent restoration to the historical conditions, but they come the closest to what we feel is important at least for the time being. To suggest that we do this in stages would mean that the water levels would be gradually increased at a time when the delta could use perhaps more than the average amount of water levels. It is my feeling, anyway, that to restore this to the long-term summer level and allow the levels of Lake Athabasca to increase in amplitude with the help of the Rochers weir would be beneficial.

MR. F. de ZOYSA

Most probably it may be okay on the upstream side, but then the downstream side of the weir most probably will have some sort of a detrimental effect. I understand that the weir will be about 10 feet high, is that right?

MR. G. H. TOWNSEND

I don't know what the height of the weir will be but the proposal is to change the average water levels that exist now on Lake Athabasca by about one foot. What this translates into regarding changes downstream, I think we have already discussed a bit. The average decrease in Great Slave Lake was somewhat on the order of one or two inches There is a graph in the Technical Report which indicates that with the weir in place some of the amplitudes on Great Slave Lake will be on the order of four to five inches in some years. From a preliminary look at this we don't anticipate that this will have as much ecological disturbance as the effects that are presently under way on the delta.

MR. F. de ZOYSA

The reason I asked this question was because over a period of one year when you raise the levels . . . . The birds nest in the delta and at that particular period of time when you raise it by a particular level a large part of the delta will be covered with water and then naturally the bird life, the nest might be—

MR. G. H. TOWNSEND

Yes, you are correct. The timing of the rise in water levels on Lake Athabasca in the past has wiped out a large number of waterfowl because it occurs during the nesting season. The value of this high rise in water is that it fills the lakes, the little marshes, these isolated basins that don't have another water supply. Nature over the years has not filled them every year and in those years when it doesn't the waterfowl produce many young. Over the last four or five years, when the reservoir was being filled in B.C., the water levels were fairly constant during the summer and we had good duck production, but the duck production became less and less and less each year that these marshes weren't filled, to the point where many of these basins went dry and then we get no production. After three or four or five years of low water levels it seems to be time for a period of high water to bring back the water.

MR. F. de ZOYSA

Thank you.

DR. S. B. SMITH

Mr. Chairman, what I would like to say for the record has nothing to do with the question of the Rochers weir and has nothing to do with government policy, but I would like to ask consideration of this panel, for the record of the Environment Conservation Authority in Alberta when they are considering recommendations.

I am a research scientist with no administrative responsibilities, but I understand clearly that all the problems we face normally in trying to deal with complicated things generally arise from lack of information. So I would like to have in the record a recommendation that the people who are making the final adjudication on these hearings and on the sort of total involvement in the delta look beyond monitoring and look beyond the technical committee report, which doesn't say very much about research, and consider whether the universities in Saskatchewan and Alberta and the Governments of Saskatchewan, Alberta and Canada would consider establishing some long-range goals for research information on the main lake. We have a very great dearth of information on fish, for instance, which I am largely concerned with. We need more innovative, that is imaginative, approaches to research, other than the standard monitoring.

I would just like to place in the record a recommendation that part of the future of the delta be involved with very fundamental long-term research that will undoubtedly give us 25 or 30 years from now, the kinds of answers we are searching for now.

MR. M. D. RASMUSSEN

I'm Murray Rasmussen, with the Alberta Department of the Environment. I'd like to ask a question of Mr. Malis or Mr. Townsend. What are the federal government's short- and long-term policies concerning the buffalo in Wood Buffalo National Park?

MR. R. P. MALIS

Very simply, our long-term policy for the buffalo population in Wood Buffalo National Park is to maintain the concept of a free roaming herd or herds in as healthy a condition as is possible with the technology and management techniques that we have available to us at this point in time. Our short-term policy is one of research, study of herd movements and an accelerated vaccination program principally focusing on the anthrax disease to try and control this to as great an extent as possible. Tied in with this is involved the construction of a large number of corrals throughout the Park on the migratory routes that these buffalo take. This will also allow us to build up a pool of data, you might say, which will allow us to better predict population increases, change in migratory routes and this sort of thing. Does that answer your question?

MR. M. D. RASMUSSEN

No. Specifically what I was wondering about, I was talking to several people when I was at Fort Chipewyan and some people yesterday when I was here, and they are wondering what their hunting rights are in Wood Buffalo National Park.

MR. R. P. MALIS

We have a policy with respect to Wood Buffalo National Park which does attempt to protect, as much as possible, the traditional hunting rights of residents in that area. However, this policy does not allow for hunting of the buffalo species. It allows for hunting of moose and certain other species, waterfowl for example, but buffalo are totally protected in that sense. In the past, when we have been able to determine that with a reasonable degree of safety we have surplus buffalo, or we can harvest buffalo without having any major impact on the long-term future of the herd, we have allowed harvest but under very controlled conditions. This harvesting is done by our staff and there are scientists from the Canadian Wildlife Service present to determine whether the carcasses are free of disease or not.

MR. M. D. RASMUSSEN

Thank you.

MR. S. R. BLACKWELL

If there are no more questions, I'd like to bring the meeting to a close. Before I do this, I would like to give a special thanks to Bill Flook and his crew, to the Alberta girls who so capably looked after the registration and other chores, and to the audio and video crews who have been busily engaged throughout this hearing in recording all that has transpired. I'd also like to thank Emily Jones, our translator; John Derkach, who arranged for facilities; and the Women's Auxiliary of the Uranium City Legion, who provided the coffee. In addition, I should thank the various resource people that are here— Ron Johnson, Gerry Townsend and Frank Forbes in particular, who were called upon for comments.

So thank you, ladies and gentlemen, for your patience, your interest and participation. I now declare this hearing adjourned.

[ADJOURNMENT OF URANIUM CITY HEARINGS]

THE RESTORATION
of
WATER LEVELS
in the
PEACE-ATHABASCA DELTA

PUBLIC HEARINGS
EDMONTON

ENVIRONMENT CONSERVATION
AUTHORITY

ALBERTA

DR. W. R. TROST

I'd like to welcome you all here today and introduce my colleagues to you. This is the first hearing we've had in which we are working in cooperation with other governments. We have with us today colleagues from the Government of Saskatchewan and the Government of Canada. Starting on my far left, Mr. Julian Kinisky of the Authority, then Mr. Fred Durrant of the Government of Canada, and Mr. Stan Blackwell of the Government of Saskatchewan. On my far right, Mr. Philip Dowling, Vice-Chairman of the Authority, and Mr. Ron Malis of the Government of Canada. We are quite glad to have representatives on the panel from the three governments, all the more so since as you know the study that was done on the Peace-Athabasca delta was conducted under the auspices of these three levels of government and the Task Force and its costs were discharged by the three levels of government. We're looking at the work that they have done and the recommendations that they have made this morning.

I think the history of the delta is well known to all of us here. With the construction of the dam, certain changes were noted in the water regimen and in the kinds of life that could be supported in the delta, and it was some time after there had been considerable discussion about the nature of the problem that this three-level Task Force was established. One of their first actions was the recommendation that as an interim measure a dam be built at Quatre Fourches, which did have some ameliorative effects together with heavy water falls and flows at that same time. In their final report and recommendations the Task Force came up with some alternative recommendations but emphasizing the possibility that an underwater weir constructed in the Riviere des Rochers at Little Rapids might go a long way to restoring the original conditions that the delta had been exposed to historically. In some ways that recommendation and the attendant data of the report and the appendices are a major focus of the hearing this morning. Naturally we have been concerned that not only the technical aspects of the project should be looked at but that also the feelings of the people whose livelihood would be affected by these deliberations should also have a hearing and that the things they believed would happen and that actually happened should be interpreted by them.

Therefore we have spent a good period of time in cooperative effort with the people living in the delta so that their points of view and their problems would be put before these hearings. It was last May that members of the Authority and others met with people at Fort Chipewyan to discuss how it would be best possible to move forward to develop the kinds of exchanges we all thought would be necessary. Subsequently, about the 1st of June, a committee was established in Fort Chip consisting of Chief Fred Marcel, Chief Albert Gladue and representatives of the Metis and trappers' associations, and this committee began to work to draw out a community point of view which would express their position and their needs in respect of these problems.

We are very pleased indeed with the way this committee worked. Its executive assistant was Pat Mercredi, who I expect will be here later this morning. We also had the assistance of some young members of the Fort Chipewyan committee, and they did a great deal to bring the story of the proposals to the community so that their reactions could be worked out. This group of young people came down to Edmonton and spent some days here. A film and slide presentation on the possible effect that the weir construction might have on the delta was prepared and they then showed this within the community.

In early September, prior to the hearings, there was a public meeting on some of the problems that they considered to be important, and representatives from the committee at Fort Chip also came down to Edmonton to meet with the members of the Authority and discuss matters of interest. As a result we felt our public hearing at Fort Chipewyan was immensely successful and the unanimity and the force with which the people in Fort Chip presented their views were very well taken by all of us. The magnificent potlatch supper they laid on for us was also tremendously well taken.

Following the hearing in Fort Chipewyan, a hearing was also held at Uranium City which was also very helpful and very well taken. So I'd like, as a matter of record, to commend the people in the delta, the people who might be affected by any changes that might occur there, for the helpful way in which they have cooperated with all of us in these hearings and the strong way in which they have worked together to bring out their views. We still expect from the people in Fort Chip and in the delta area an additional written submission following on the discussions we held during the public hearings and we hope to meet with them again after we have received this brief from them.

Today in Edmonton we think that the hearings will probably take a more technical turn and the questioning will probably be somewhat more scientific and academic. Our intention as described in the prospectus was to examine such things as the downstream effects of the proposed weir, not only on the Slave River but also beyond Great Slave Lake into the Mackenzie River system; also to examine such things as the modifications, additions or supplementary installations which might be considered necessary to avoid or minimize any adverse effects on the area or the interest of its inhabitants; and also to examine any alternative proposals with full discussion of the implications of these various alternatives to the delta itself, its flora and fauna, the lives of its people and the downstream situation.

In our hearings in Fort Chip and Uranium City we had full translation from Cree into English and from English into Cree, and at Uranium City from English into Chipewyan. Today I think it will not be necessary to have translation of the spoken word, but we do have copies of certain documents which were also translated into Cree. This piece of work done by Dr. Smith has been translated into Cree and our prospectus is also translated into Cree.

This morning, then, we'll start off with a submission by Mr. Frank Forbes, who is the Chairman of the Intergovernment Liaison committee of the Delta Task Force.

[Mr. Forbes here summarized the Peace-Athabasca Delta Project Group Technical Report. His summary appears on page 43 of these proceedings.]

QUESTIONING BY THE PANEL

MR. J. J. KINISKY

What level of flooding is required before the perched basins in the delta actually get the supply of water which sustains them?

MR. F. J. FORBES

The perched basins in the delta are distributed around the larger delta lakes, Mamawi and Claire, and are not at one level. As you move further away from the lakes you increase the elevation some. I think it's safe to say that probably most of them are certainly below the level of 688, so that the flood level which we would like to see is 688.5 in order to flood the delta. Now this is the average level for flooding. In some areas it has gone up to as high as 693 and in other years it's, say, 687 or such. In terms of your question, we have a profile of perched basins as we move away from the delta lakes and you would have to refer to that in order to answer specific questions on the extent of flooding or flooding level.

MR. J. J. KINISKY

So chances are that those perched basins to which there is no water access unless you have flooding beyond 688.5 are just going to have to make their own way in life?

MR. F. J. FORBES

In restoring natural conditions, again if we have a wet year we'll have a high run-off on the Athabasca and the Fond du Lac and we will get levels up to 690 and such.

MR. J. J. KINISKY

Right now if you move for the sunken weir structure, what is going to happen as far as the low levels are concerned? Is there going to be a sufficient outflow back into the Peace River so that we will get the necessary drainage to restore the low water levels that historically appeared?

MR. F. J. FORBES

Yes. In our report, and at this stage it has to be considered preliminary, we have gone far enough to establish the technical feasibility of this structure. The setting of the sill level for the structure would give it slightly higher levels during the winter. Now there is additional work being looked at by the Implementation Committee on adjusting sill level. In general we would get slightly higher levels in the winter.

MR. J. J. KINISKY

Then presumably there would be the continued drainage still taking place through the Quatre Fourches channel back to the Peace?

MR. F. J. FORBES

That's right.

MR. J. J. KINISKY

I'd like to get a few questions into the business of ruling out a controlled structure. You say that the Task Force's main reason for not using the control structure is the complexity of working with an intergovernmental agency and making the decision necessary in the control of the structure itself. Are there not a sufficient number of ecological advantages to a control structure so that certainly the mechanism of administration could be overcome?

MR. F. J. FORBES

It's a case here of trade-offs, and at this point I may try to maintain some flexibility and leave some options open. In the case of the Park, and 80 percent of the delta is in the Park, their policy is that they want it put back to the natural regime. This is not the administrative policy of the Department, it's legislation. So this became an important factor. Also, to try to manage to obtain a regime similar to the natural with the gated structure would involve difficulties in terms of the technical aspects. You would have to have a sophisticated forecasting system. This would mean you would have to have readings of the snow cover forecasting and in that area we didn't do a study on it, but the evidence from other areas is that there are certain limitations as to how accurately you can forecast and control levels.

The key problem that confronts us is who is going to make the decisions if you have a number of jurisdictions and unlimited water. For example, just to refer to federal agencies, if we have a dry year and we have, say, Lake Athabasca at a level of 689 and low water on Great Slave Lake, who is going to make the decision to open the gates and lift the level of Great Slave Lake to improve navigation on the Beaver Lake? Because of these types of problems, the complications of making these decisions and the fact that we're dealing with a unique delta and the Park, we ruled it out and went for the fixed weir. Now, again, we're saying that this is a minimum action and we could meet the other needs if we increase putting in marshland works to improve the populations of muskrats in the delta. This will certainly help there. We can help fishing by correcting any problems with channel ice in the Richardson Lake area. So it looked to us in terms of the tradeoffs, in terms of the options available, that this was the best solution.

MR. J. J. KINISKY

Traditionally the Peace River itself, before we had the dam problem, acted as a hydraulic dam, but also it must have been a contributor of sizable amounts of water to the delta in the flooding process in that there was overland flooding besides that which went through the channel. Once we wind up with the structure that we have now, when the Peace River does rise to the position where there can be a flow back through the Riviere des Rochers to the lake system again, what sort of an impediment is the sunken weir going to be to that sort of a contribution from the Peace River?

MR. F. J. FORBES

Just to put this into perspective, in order to raise the level of Lake Athabasca the 5½ feet or so which it normally goes up in the spring, you need 13,000,000 acre feet, increasing it from 682 to 688. Prior to 1968 the net outflow during the period of May, June and July was roughly 3,000,000 acre feet. During this period roughly 12,000,000 acre feet flowed out, so I think this gives you some perspective of the functioning of the Peace River in this case.

I might call on Jim Card, hydrologist, to comment in terms of how much water will come in in the future and under the modified regime.

MR. J. R. CARD

Very definitely the submerged weir that's proposed on the Riviere des Rochers would limit the amount of water that could flow southward from the Peace River. However, the Peace River will be considerably changed from what it used to be in the past, and the opportunity of Peace River water flowing southward in the Riviere des Rochers is not the same as it was before. Therefore the restriction that might exist there because of the submerged weir is a relatively small factor, but it very definitely will limit the amount of water that can flow southward.

MR. J. J. KINISKY

So in fact, the actual elevation of the water in the Peace River in flood times is quite unlikely to get up above, say, 684 or 685 or something like that?

MR. J. R. CARD

Well, without a little more careful thought I couldn't comment on the figures. But there will be likely rather limited probability of Peace River flow directed southward under the conditions of regulation.

MR. J. J. KINISKY

What is the possibility of ever again having overland flooding, which was traditional before we had the Bennett Dam in place?

MR. J. R. CARD

Well, overland flooding still can occur; in the future it will probably occur more as a result of ice jams and the resulting rise in water levels above the jams to create the overland flooding. Prior to 1968 overland flooding could have been created by summer floods without the presence of ice. This flood is largely not to reoccur under the regulation by the Bennett Dam.

MR. J. J. KINISKY

Mr. Forbes, if your sole purpose in making the control structure was to come back to the closest representation of what were the historical water levels there—let's not consider the administrative problems or anything else— which would you actually choose?

MR. F. J. FORBES

We would probably go to a restriction at the Slave site. In this case you're getting into the fact that if we were into the Slave site we could technically completely restore all aspects of the regime in the delta and by this I mean the erosion, sedimentation, water quality, etc.

MR. J. J. KINISKY

During the course of our hearings in Fort Chipewyan there was some concern expressed about the sunken weir being placed in the Riviere des Rochers as it would concern the passage of boat traffic back and forth. I notice that in the Technical Report you mention that there is the Quatre Fourches channel which they can use. Some of the representations told us a little bit different— that as a matter of fact using the Quatre Fourches channel would put another 30 miles onto a typical trip they make. How difficult would it be to put in some sort of simple assistance for navigation in conjunction with the Riviere des Rochers sunken weir?

MR. F. J. FORBES

First of all, I think we have to distinguish between local traffic, which would be using boats up to, say, 15-16 feet, and barge traffic. Barge traffic has dropped off in the area north of Fort Chipewyan and my understanding is in recent years they've only used the Riviere des Rochers channel during higher flows coming down, and that normally they use the Quatre Fourches. In terms of the local traffic, provision will be made if they proceed with the weir to handle this and this would be a type of a marine railway which you could load the boat on to haul it over.

MR. J. J. KINISKY

Thank you very much.

MR. P. J. DOWLING

Mr. Forbes, I also have some questions which concern the gated structure. With respect to the site on the Riviere des Rochers can we assume that we can have the same hydrological regime if we use the gated structure or if we use the submerged rock-fill weir?

MR. F. J. FORBES

In terms of the lake level hydrograph we obtain with the fixed weir, we don't obtain quite as high a flood peak— we may obtain a slightly higher level during the summer. In other words, we have a slight flattening of the lake level hydrograph. In terms of the gated structure in our work, we assessed it in two ways— with the gates fully opened and with the gates closed— and we documented this in the report. It was our feeling that with adequate forecasting and proper operating procedures we could come fairly close to the lake level hydrograph which existed prior to 1968.

MR. P. J. DOWLING

But you could make the gated structure perform as well as the submerged weir?

MR. F. J. FORBES

Yes, depending upon . . . as I mentioned earlier there are in my opinion some pretty serious limitations on the forecasting and the decisions as to when you open that gate. For example, the Bennett Dam is some 700 miles above and depending on their releases or the flows from the Smoky, etc. we would have to have a pretty sophisticated system in order to come close to the natural.

MR. P. J. DOWLING

Would we be able to establish the same biological regime if we used either the gated structure or the submerged weir? Can they be equated?

MR. F. J. FORBES

The biological regime is dependent upon the water levels, so it depends on how close either structure comes to recreating the allotted levels.

MR. P. J. DOWLING

With the gated structure could it be designed in such a way that it could take flow in both directions on the Riviere des Rochers?

MR. F. J. FORBES

Technically I think it would probably be difficult, more from the structural and operating point than from the hydraulics. You could open the gates if the water was up, and let it come in, but this would require a further look at it in terms of the structure.

MR. P. J. DOWLING

But this is a facility that would be superior in a submerged weir?

MR. F. J. FORBES

It would. You come closer to the natural regime provided that you could first of all establish an adequate forecasting system and provided that you can set up a proper intergovernmental group to do this and have a proper operating procedure for making decisions and operating the structure. I might also add here that if we went to a gated structure at the Riviere des Rochers site it would be $5 million compared to $1 million. We suggested the proposed submerged weir as a minimum action as a first step, and in the future there may be other developments in the basin which would necessitate a further look at it.

MR. P. J. DOWLING

But wouldn't we have more alternatives open to us if we had a gated structure? Supposing the submerged weir doesn't give us the kind of results we're looking for. With a gated structure we have some alternatives— we can at least open and close the gates.

MR. F. J. FORBES

That's true, but you're still faced with the fundamental problem of forecasting and making the decisions. With the gated structure you're going to still operate it to restore the natural; it still wouldn't improve the muskrat trapping, say, in the Chip Reserve over and above what the natural is. The approach we are taking is that we put it back to natural with the weir then take a further look to marshland works in the Alberta portion of the delta, the Chip Reserve, and say okay, you can increase the muskrat in this area by putting in a series of small little dikes and dams and so forth.

MR. P. J. DOWLING

On page 149 of the Technical Report there seems to me to be an element of uncertainty expressed, words to the effect that, "If it appears that a dam on the Chenal des Quatre Fourches is required for the Rochers alternative to be successful, the combination of the two structures would completely block a major fish migration . . . ." This introduces an element of uncertainty as to whether the submerged weir is going to give the results you hopefully forecast for it. Could you comment on that?

MR. F. J. FORBES

You're referring to the possible need for additional structures on the Quatre Fourches?

MR. P. J. DOWLING

That's right.

MR. F. J. FORBES

No, I don't think so. Our findings from the study are that we wouldn't need structures on the Quatre Fourches and that this could be left open for navigation for fish migration; however, due to the physical make-up of the delta and the type of soil there we could get erosion which could eventually lead to changes in that channel and increase the discharge. At the present time the Quatre Fourches only carries ten percent of the flow, so we suggested that this all be monitored, but in our opinion at this time structures on the Quatre Fourches would not be required.

MR. P. J. DOWLING

To get back to one other point with respect to the gated structure, has your Study Group made an estimate as to what it would cost to maintain and to operate a gated structure on the Rochers? For instance, on an annual basis.

MR. F. J. FORBES

We estimated that a gated structure on the Rochers would be roughly $5 million. I'd have to check back on our notes for what it would cost in terms of operation. Off the top of my head, we may be talking of $50,000 a year— that may be too high, but something in this order. If you want an answer to the operating costs I'll have to go back and get that for you.

MR. P. J. DOWLING

Perhaps, Mr. Chairman, we might ask Mr. Forbes to provide that if he has such a figure.

DR. W. R. TROST

Since you've suggested it, you might then do it, Frank.

MR. P. J. DOWLING

I have one other question, Mr. Chairman, and this is concerning the reference to hydrodevelopment on the Slave at Mountain Rapids. I'm not too sure exactly where Mountain Rapids is, but how far would it be away from the source of the Slave? And what comments might you have concerning such a development, should it take place?

MR. F. J. FORBES

It's about a hundred miles. We looked at that— if they went ahead with that development— in terms of its effect on the delta and Lake Athabasca and also if it might be possible to obtain water levels in the delta with that. At the time of the study the indications were that this development of Mountain Rapids is a long ways in the future, so therefore we dropped further consideration of it.

MR. P. J. DOWLING

Thank you very much, Mr. Forbes.

MR. R. P. MALIS

Yes, Frank, I'd like to explore a bit further, in addition to the questions that were asked by Mr. Dowling and Mr. Kinisky, the submerged weir which you people are recommending versus the gated structure. As you indicated, the gated structure would be theoretically capable in any case of reflecting almost exactly the previous natural water regime and the submerged weir would come close, but such things as the low water conditions in particular would not be met and the high water conditions might not be met exactly. I wonder if, in terms of the Park portion of the delta, you could give us some idea just what the effects of this slightly modified water regime would translate itself into in terms of ecological factors and biological factors in the delta— just what difference might this make?

MR. F. J. FORBES

I think I'd like to call on Gerry Townsend to discuss the changes in the habitat and the wildlife.

MR. G. H. TOWNSEND

As Frank mentioned, the modified regime results in an average summer level decrease of about one foot and an average loss in amplitude on Lake Athabasca of two feet. The submerged weir will restore the average summer level; the submerged weir will restore half of the amplitude, so instead of a two-foot loss in amplitude we have a one-foot loss in amplitude over the natural regime.

There's a table on page 135 of the Technical Report which translates the effect of these water regimes into wildlife productivity on the delta. There is a column which indicates the average annual production of the various wildlife species and several other columns which indicate how modification of this natural regime by the Bennett Dam and by the various remedial structures will restore the wildlife productivity. We discussed this also in the individual sections on the various structures.

To summarize, the Rochers weir on the far column to the right seems to provide the best restoration of those structures listed there in terms of the animal numbers. The perched basin habitat which is expressed in miles of shoreline is the item that's least satisfactorily restored. We still have 24 percent reduced perched basin shorelines even with the weir in place. The reason the animal numbers are better restored is that the amplitude on Lake Athabasca and the flooding of the delta in the summer were not always particularly productive to some of the wildlife species. The floods are required to fill the perched basins but they also destroy the waterfowl nesting and in some cases muskrats, one or more of the two litters. In summary, this column here indicates anywhere from 5 to 10 percent departure from the natural production with the weir in place, whereas we will still have a 24 percent loss in shoreline. Does that answer your question?

MR. R. P. MALIS

Yes, I think in a general sense, Gerry. Could you give us some idea what this major reduction in perched basin shoreline means in terms of the biological communities?

MR. G. H. TOWNSEND

The reduction in amplitude will tend to restrict the vertical ranges of the habitat zones, whereas historically the sedge meadows may go up two feet on the landscape. There's a table in Chapter 4 indicating the average vertical widths of the habitat zones. The reduction in amplitude will draw this down by approximately 50 percent. So your most productive shoreline types are reduced— I'm thinking of the sedge meadows and so forth. There will be less violent fluctuations of water on the delta. This will tend, as you can see from that column, to increase productivity to just about what it was under natural conditions. The habitat will be modified.

MR. R. P. MALIS

You indicated the difficulties in establishing a run-off forecasting mechanism which would be necessary for the operation of a gated structure. How far did you explore this particular problem in determining the complexities of it and the costs, and what was involved to establish this?

MR. F. J. FORBES

We didn't make an estimate of the costs that would be involved here— in this case we would be speaking of, say, the additional stream flow gauges or snow courses or telemonitoring work communication system that you would need on this. We discussed it from the point of the feasibility of doing it and we looked at other cases where we have first-hand knowledge of attempts to do this. I can refer to cases in, say, Ontario where you have different groups on lakes— in the Kawarthas, for example. The cottagers have moved in and they're using those lakes now for recreation, where they were intended to provide storage for the Trent-Severn system. There is just an endless dogfight there, if I can use that term, trying to balance the needs of the two groups. In our opinion, considering that you would have involved three provincial governments, the Northwest Territories and the federal government through Parks, such a system would be extremely complex and when the crunch came probably it would be extremely difficult to make it operate. These things, from my experience with them, work fine when you have lots of water and the levels are up. The crunch comes when you have a dry year and somebody has to start saying, well, okay, I'm going to drop the water levels in the Park this year, take the chances on the muskrat and provide additional water on Great Slave Lake for navigation.

MR. R. P. MALIS

In your opinion are we at the state of sophistication in this technological sense to carry out this form of monitoring program and comes pretty close to reflecting that in a mechanical sense— to come sort of 'bang on' you might say in terms of imitating the original natural regime? Do you think it's technically possible?

MR. F. J. FORBES

In my opinion I think it would be difficult because of the small range of levels we're dealing with. In the delta, as Gerry indicated, the sedge meadows are in a vertical range of two feet and therefore we're concerned about very fine fluctuations. I think that technically this would be fairly difficult to duplicate.

MR. R. P. MALIS

Thanks, Frank.

MR. S. R. BLACKWELL

I'd like to direct a couple of questions to Frank Forbes or Jim Card concerning ice jams. Particularly I would like to have some comment on the effect of ice jams on the flooding of the delta. Is this not one factor that makes it difficult to predict the actual effects of any kind of control structure?

MR. F. J. FORBES

Well, it certainly enters into it because of the unpredictability of ice jams, and you're speaking of ice jams on the lower Peace or on the Slave for example. I think we can probably say the ice jams that occur will add to the flooding, but it makes it more difficult to assess what will be the effects of the structure.

MR. S. R. BLACKWELL

Maybe I could ask a follow-up question related to this. Will ice jams and the resulting flooding therefrom occur in future as in the past? Jim Card said that in the future the southward flooding from the Peace will be largely due to ice jams. I wondered if this process has been interrupted by the reduction in peak flows as a result of Bennett Dam, because obviously the submerged weir is not going to have any relationship to the dams on the Peace River, or at least this is my——

MR. F. J. FORBES

Yes, we will get ice jams in the future. Whether we get one jam in ten years or three jams in three consecutive years we probably have no way of knowing with the reduced flows. Perhaps Jim could check me on this, but I would think that we probably won't get as many ice jams as we did in the past simply because we don't get the water pushing the ice down and piling it up. Would that be correct, Jim?

MR. J. R. CARD

The subject of ice jams on the Peace River and on the Slave is something which we definitely looked at during the course of the study. I think most of you would agree that it's most difficult to document the exact behavior of any particular ice jam, but my observations there would lead me to believe that ice jams that occur on the Peace and on the Slave as we saw them in the last several break-ups would likely still continue to occur in the future. But how high they would raise water levels and so on is virtually unpredictable, except based upon what happened in the past, and we do know that in the past the ice jams were sufficiently high to create overland flooding over the banks of the Peace and to create southward flows in both Chenal des Quatre Fourches and Riviere des Rochers. If winter flows are definitely higher as a result of the regulation by the Bennett Dam than they were under unregulated conditions the effect that this will have on the ice is probably one of creating levels in the river in the springtime which are higher than they used to be. The potential to create ice jams I think is still there regardless of the fact that the water levels might be higher. I don't know whether that answers your question or not but I think that the effect of ice jams will be similar to what they were in the past; that's based on observations over the past three years.

MR. S. R. BLACKWELL

Another question. It seems to me that there may be some argument in favor of a regime which is different from the natural regime. I would like to hear comments on the pros and cons of a new regime, let's say how about raising the water levels an average of a foot higher than the natural water levels.

MR. F. J. FORBES

Before we answer your question, Stan, you have to go back one step before you consider structures and that's the regime on Lake

Athabasca. Then you have to look at the different groups involved. One of these is the Park— 80 percent of the delta is in Wood Buffalo National Park and The Parks Act says that they will maintain that in its natural state. And there are other needs in terms of the fishing and the trapping. This is where you have to start, and that's why I was briefly reviewing my opening remarks— the fact that we didn't start with the structures, we looked first at the four different options that were open to us. If you were going to come up with a modified regime, or a new regime as you say, then you'd have to somehow develop an acceptable rationale for changing the habitat and the wildlife of the delta in terms of the Park. The second question would be, how would your new rationale fit muskrat production in terms of the Alberta portion of the delta and the Chip Reserve. Does that— ?

MR. S. R. BLACKWELL

I think, yes. In part I was thinking that a new regime might benefit the muskrat population, it might benefit waterfowl, it may create adverse effects for some other—

MR. F. J. FORBES

I think if you'd like to pursue this I should have Gerry Townsend comment on it. In our opinion if you were going to manage the delta for wildlife productivity you would not try to do it through controlling the lake levels of Athabasca; you would divide the delta up into compartments or different areas depending upon the capability of the delta for muskrat production, waterfowl, etc. For example, in terms of muskrat farming, you would take a specific area and set up your structures and procedures so that you would maintain the levels up high for a few years to build up the populations and then drop the water levels in those areas to let the vegetation re-establish again and flood other areas. Perhaps, Gerry, would you like to expand on that?

MR. G. H. TOWNSEND

Well, I thought you did pretty well. From a wildlife productivity standpoint the fluctuations that historically occurred in Lake Athabasca are not exactly timed for the best production of waterfowl, muskrats and so forth. The perched basins require refilling periodically but if one were going to do this under a managed regime one would not fill them during the midsummer when the ducks and muskrats are busy producing the young ones. For each wildlife species and for each fish species there would probably be a different or slightly different water level regime that would be considered optimum. And then one would have to decide in what parts of the delta one would like to concentrate on producing what species— would it be goldeye in Lake Richardson, would it be muskrats in the Chipewyan Reserve and so forth. This would tend to lead to a compartmentation system whereby different parts of the delta could be managed at different times for different things.

When all this is considered one must still consider the source of water. Is the water available when the animals need it? One of the reasons we made the decision to go to the Rochers weir was that we would restore the average summer levels which would at least give us that average level to work from. We indicated that the weir would be a minimum step and that further action should be taken in other parts of the delta where management could be considered and we would have that increased height of water to work with to bring water into the marshes.

MR. S. R. BLACKWELL

One final comment in connection with this. It seems to me that you could have a management type of regime or you could consider the question of what the elevation of the top of the submerged weir should be. It seems to me that the level of that weir could be high enough that you could in effect get a higher peak and a higher minimum level.

MR. G. H. TOWNSEND

Yes. The consideration was quite complex. The average summer level we were very anxious to restore because the average summer level is the growing season level for the plants. The amplitude fills the basins and the average summer level distributes the vegetation around the basins. If you shift the average summer level higher, what will occur then, over time, is a totally new shift in the vegetation around the basins and around the major lakes of Lake Athabasca and the delta. So any departure from the natural regime will bring about a shift in plant succession, either backwards or forwards depending on which way you're putting the water. But over the long period it would eventually come to an equilibrium.

MR. E. F. DURRANT

I have two questions, Mr. Chairman. In those latitudes ice can be four to five, maybe more, feet thick by spring. In the neighborhood of the weir it will be moving around 15 feet per second, I imagine. All through the winter if there were a gated structure at the weir site there would be icing problems on the gates proper. My question is, Frank, in developing this concept that you looked at in your report, was there some question as to whether the operation of gates is technically feasible in that situation from November to May 15th?

The other question leads on from that: if a gated weir were selected as the best solution what sort of delay might be encountered because of the necessary design process, the ordering of the gates, the fabrication, delivery and installation?

MR. F. J. FORBES

In answer to your first question, certainly the ice would be a problem with gates. Given the cost, I think that the problem could be solved but it could create difficulties in operating the gate. The problem of ice was one of the reasons that we ruled out the Slave site. In answer to your second question the design, ordering of gates, etc. would probably lengthen out the period to design and build a gated structure at the Riviere des Rochers by, I would say, probably a year to a year and a half. It would take longer— you'd have to have the gates designed to not only stand the tremendous ice pressures that would occur with ice but also, and this would be just as difficult, the passage of ice. Structures have been built in northern areas to handle ice, so it could be done, but it certainly requires additional design work, probably model work on the passage of ice and so forth, so it would lengthen out the design and construction period by a year to a year and a half.

DR. W. R. TROST

In the work of the Study Group was a physical model used in any stage? Did you have time to do that kind of work in reaching your conclusions?

MR. F. J. FORBES

Yes, we did have some model work on this. Would you like a description of this?

DR. W. R. TROST

Yes, please.

MR. F. J. FORBES

Jim, would you like to outline our model?

MR. J. R. CARD

The models which the Project Group looked at were the physical hydraulic models of the weir and the river constriction. These were hydraulically modelled to determine some of the things which were not known— the size of rock, the amount of seepage through such a structure, the stability of a structure of that nature and so on. These were carried out by the then Alberta Water Resources with the assistance of the University. Other than that those were the only physical models except for some physical modelling done in relation to the studies of the construction of an ice jam, and that was related to determining how much ice would be taken underneath a downstream sheet of ice to create a hanging dam.

DR. W. R. TROST

In such a model you're really proposing damming one connection between the Peace and Lake Athabasca, but there are many other connections to the delta between the rivers and the lake. Was such a model able to tell you how effective and for how long the effectiveness would be retained of damming one connection when there would be a connection that could take up the counterflow?

MR. J. R. CARD

This was not physically modelled, no. The only information we would have on the effectiveness of the other channels is based upon a mathematical model of the whole system. Would you want me to go into that?

DR. W. R. TROST

A little bit, if you can answer that question. It seems to me to have some relevance.

MR. J. R. CARD

With a submerged weir on Riviere des Rochers the mathematical model indicated that the flows in Revillon Coupe would be considerably increased, with an additional increase in the velocity such that the channel of Revillon Coupe would have a potential for becoming enlarged, therefore decreasing the effectiveness of the structure on Riviere des Rochers. The Chenal des Quatre Fourches is one which we believe, with the knowledge that we presently have, would not be seriously eroded. It will definitely be subject to a change in its flow characteristics and we would propose that this be carefully monitored. But based upon what we know now it did not appear that the Chenal des Quatre Fourches would enlarge or change such that it would detract from the effectiveness of the structure on Riviere des Rochers.

DR. W. R. TROST

Even in a period of time—five years? These floods can of course vary sharply in these channels and so on.

MR. J. R. CARD

It might be perhaps in a longer period, this is why we would be very adamant about monitoring that particular channel.

DR. W. R. TROST

If monitoring did show up something what would you do?

MR. J. R. CARD

That situation would have to be assessed and if the changes were detrimental to the effectiveness of the control, then I think it would probably be necessary to consider a structure of some sort on—

DR. W. R. TROST

On the alternate channel.

MR. J. R. CARD

On Quatre Fourches, yes.

DR. W. R. TROST

Do you plan to keep the temporary dam in Quatre Fourches until the other device is completed?

MR. J. R. CARD

This is an entirely different situation. We would propose that that temporary impoundment structure on Quatre Fourches be left there until a satisfactory restoration of levels in Lake Athabasca had been accomplished.

DR. W. R. TROST

Returning a bit to the original line of thought, your proposal in essence diverts Peace River water almost altogether from the lake and substitutes Athabasca water as flooding waters in the lake system. Is that right?

MR. J. R. CARD

Close, yes. The Peace River used to act as a hydraulic dam, thereby completely closing off the outflow from the Athabasca. At times it did add water to Lake Athabasca, an average of something like a million acre feet. With a structure on Riviere des Rochers the effectiveness of the Peace River in adding any water to the lake is greatly reduced; therefore by any control on Riviere des Rochers we become much more dependent than upon the direct inflow into Lake Athabasca from such rivers as the Athabasca and Fond du Lac. The water levels then become much more a function of the inflow rather than the flow in the Peace River.

DR. W. R. TROST

Yes, and do you think that will create any changes for you now or in the future that wouldn't have come about otherwise? Include the possibility that tar sands might be developed on the Athabasca.

MR. J. R. CARD

Well, we examined the situation the way we saw it today. The mathematical modelling which was done is capable of being modified so that if there are changes proposed on the Athabasca River those changes could be translated into effects on Lake Athabasca— the same with Fond du Lac. These possibilities we knew to exist— we were unable to necessarily quantify them. But we do have the capability to determine what they are once someone can advise as to what the changes might be on the inflowing rivers.

DR. W. R. TROST

Perhaps I should address the next question to Frank. I had the feeling from your statements and from the answers to the questions that, of the three alternatives, you apparently most seriously considered (1) a structure on the Slave, (2) a gated structure on the Rochers and (3) the underwater weir. You really rated the underwater weir lowest, but with the gated structure you thought you'd either have a civil war or a civil servants' war and so ruled that out, the Slave structure seemed to perhaps be too complicated or too expensive a task, or you had technical problems of other sorts. Is that right?

MR. F. J. FORBES

If you want to completely restore the natural regime in the delta you have to look at not only water levels but water quality and sedimentation, etc. And the only way to completely restore the delta in all these aspects would be either to blow up the Bennett Dam or get Peace water back in there, which would mean that you're going up to the Slave site. The other site appeared better as a minimum action at this time and left us some flexibility. You already mentioned the tar sands, and there are other developments on the books in the basin, so that going with that helps to provide for some flexibility. We're not putting a lot of money into it, we're saying that we will monitor this structure.

If it doesn't do quite what we'd like it to do we can raise or lower it a little bit to obtain the levels that we want. Does that answer— ?

DR. W. R. TROST

Yes, although I'm still interested in the abandonment of the Slave project. Were there additional reasons for— ?

MR. F. J. FORBES

Well, first of all, we would have to put in locks there and a fishway, and we would have problems with ice at the Slave structure. A gated structure at the Slave would cost an estimated $20 million. Restriction at the Slave was $5 million. So these were the factors on which we ruled out the Slave.

DR. W. R. TROST

Regarding your comments on a kind of a zone management approach to the delta using the weir as your base, do you feel that you're sure enough and competent enough of your recommendations, which are really at an interim stage, to be reasonably sure that you could pull off good zone management in the delta area with the weir? I'm really referring here to the description that both you and Gerry gave.

MR. F. J. FORBES

Yes. Perhaps zone management is not a good term there because we wouldn't be adopting a compartmentalization of the delta. We would look at specific areas, for example the Chip Reserve or Alberta portion of the delta, and then depending upon the initiative of the local people— if they say they want muskrat farming in that area— the financial and technical expertise would be made available to do it. We are sure that the muskrat populations, for example, could be substantially improved. Given the fact that at this time there are something like 200 trappers in Fort Chip, probably less than 15 are real serious trappers and you could meet their demands.

DR. W. R. TROST

Then you're not suggesting that you would in fact put additional supportive control structures in to get somewhat different water conditions in different parts of the delta suitable to certain productivity purposes?

MR. F. J. FORBES

Oh yes, right in the Chip Reserve and the Alberta portion, definitely yes, but these would be small structures— perhaps opening up a ditch into a basin or putting in a culvert with a flap valve on it so that you could open up and let the water in and then close the valve and flood that particular small basin.

DR. W. R. TROST

And these kinds of proposals are not prepared now but will be in a subsequent report or recommendation?

MR. F. J. FORBES

We haven't identified specific basins. I said you could do this here and here. We know enough about it so that it can be done if it's requested by the local people and we could improve the muskrat populations.

DR. W. R. TROST

So you would think of doing this in cooperation with the local people?

MR. F. J. FORBES

That's right. We adopted the principle that the initiative should come from the local people in doing this; if they make the request then the government should be prepared to provide the technical and financial assistance to do it.

DR. W. R. TROST

The Quatre Fourches dam flooded something over half the delta area. Have you good confidence that you will with this device be able to put water back on the whole of the affected area? I think there was some exception with high basins, but apart from that.

MR. F. J. FORBES

Well, yes, it has proved itself already that we were able to raise the water levels, for example to 689 in Baril. The effectiveness of the Quatre Fourches structure in any particular year depends upon the run-off in the perched basins, McIvor etc. and there's quite a variation in the run-off there— from about 300,000 acre feet to one year when we had over a million acre feet. We can certainly get the water levels up again— as long as it's in there it does that. In our report we recommended that it be removed and this is based on water quality consideration, but if it was left in there permanently it would reduce the flushing action in the delta lakes with water from Lake Athabasca. The flushing action is essential to prevent a build-up of salt in those delta lakes.

DR. W. R. TROST

Now, Frank, what about the downstream effects on the Slave and the Northwest Territories lakes and the Mackenzie River?

MR. F. J. FORBES

With the restoration of natural levels on Lake Athabasca, the full effect of the Bennett Dam will be felt at Great Slave Lake and the Mackenzie. At the present time the Bennett Dam lowers the water level on Great Slave Lake roughly by half a foot, and if we restore water levels on Lake Athabasca it would be approximately 0.1 foot. So really our work would not be significant in terms of the Mackenzie and Great Slave Lake.

DR. W. R. TROST

Will it affect transportation on the river?

MR. F. J. FORBES

No.

DR. W. R. TROST

The season change will be altered now, though, won't it?

MR. F. J. FORBES

The additional lowering due to our structure would be 0.15 foot, which would not really be significant considering the—

DR. W. R. TROST

Even in the flood mode of the Mackenzie?

MR. F. J. FORBES

No.

DR. W. R. TROST

You have of course talked about this with the people who are using the river for transportation with boats?

MR. F. J. FORBES

Yes, we had Doug Forbes from Public Works, who was a member of the Technical Advisory Committee and looked at this during the review of the Technical Report.

DR. W. R. TROST

Did they agree with you?

MR. F. J. FORBES

Yes, they agree with us. I think Doug's position is that we have some real severe navigation problems on Beaver Lake and if there's any place in the basin we could get additional water, we'd like to have it.

DR. W. R. TROST

One of the appendices in your report dealt with social and economic factors. Do you feel that the restoration resulting from the weir will increase employment in trapping and other uses of the delta an appreciable amount— and to what extent, if you have an idea?

MR. F. J. FORBES

We can best answer that by looking at trapping and fishing. The restoration of water levels will restore the muskrat populations to what they were prior to 1968, and the same with the fishing, so that the resource is there if the market is right and if the people wish to trap. In our opinion there is a lot of work that needs to be done. We found a lot of areas where increased cooperation between agencies and additional help could improve the marketing and the fishing. But I think to answer your question, what we are doing is restoring the resource so that if the trapping and fishing go ahead it will be there.

DR. W. R. TROST

But you didn't really analyze what the impact on the community would be or what might still be needed to satisfy the community's needs?

MR. F. J. FORBES

Well, we can answer this in saying that the present level of employment— and we're talking about seasonal employment so we have to talk in terms of man months— is roughly 25 percent without trapping and 27 or 28 percent with trapping, so that anything that can be done to provide jobs in Fort Chipewyan, even ten jobs, would be a marked step forward.

DR. W. R. TROST

Frank, we've held you long enough, and thanks very much.

I'd like to now call on Dr. Stu Smith to present the Alberta position statement. Dr. Smith was one of the first people to be aware of the problems of the delta and has been working on it for a long time.

[Dr. Smith here summarized his report, which appears on page 1 of these proceedings.]

[LUNCH BREAK]

QUESTIONING BY THE PANEL

MR. J. J. KINISKY

Dr. Smith, what season of the year does the walleye spawning in Richardson Lake take place?

DR. S. B. SMITH

In the spring the walleyes move from Lake Athabasca in normal water flow up under the ice of the Jackfish channel into the north outlet of Richardson Lake and as the ice goes out, or perhaps even a little prior to ice going out, they spawn on the shores of Richardson Lake.

They stay in Richardson Lake for varying periods of time, but on high water and as the outflow increases out of Richardson Lake they move back down the channel into the main lake. As far as I know we don't have sufficient data on when the larvae move, but judging from other areas commonly they would be moving out within 12 to 14 days after the eggs have been laid. It takes that long to hatch and get them moving.

MR. J. J. KINISKY

So that when there has been a spawning problem, there has been sufficiently low water that the channels have actually frozen to the bottom and the fish can't come through to spawn, is that the problem?

DR. S. B. SMITH

That's one of the problems and that happened one year when the fish were blocked for some time in getting up the channel, I think it was in 1971. The fish were temporarily blocked in the Jackfish channel from getting into Richardson. We don't really have any knowledge of how this affects them, but generally speaking these animals are attuned quite well to light intensity— increasing increments of light will bring them to sexual maturity— and they are also attuned to the normal regime. Delays can be awkward for some species of fish. Of greater concern, though, if the water is marginal and the fish move in and then the water drops and the fish can't get out, are the hundreds of millions of larvae in the lake which supply recruitment for the fishery. If they can't get out into the lake then obviously we have no recruitment.

MR. J. J. KINISKY

If we go for the fixed weir in the Riviere des Rochers, in fact what we are going to do is keep those channels with more water in them, that is deeper, to assure more success at spawning.

DR. S. B. SMITH

Yes, that's true. I wouldn't have any reservations, really, about the spawning success of walleye in the Richardson, Mamawi or Claire areas if the Rochers weir is put in.

MR. R. P. MALIS

I was very interested, Dr. Smith, in your comments on the tourist industry and the strong or predominant role the Park might play in providing real opportunities in an economic sense to the community of Fort Chip. I was wondering what your views might be in terms of the form that this would take. Do you see Fort Chip as being the center for the visitor facilities that would be required to support this kind of industry, or do you see that perhaps some of these facilities might be required within the Park, or just what sort of relationship do you visualize here?

DR. S. B. SMITH

Well, I haven't really given too much thought to facilities except to say that some of the recreational opportunities for visitors would be by boat and it would seem logical to base them in Fort Chipewyan, perhaps through the co-operative or some local association, and run them from Fort Chip up the Quatre Fourches and out in those directions. It is quite easy access, as you know. On the other hand, there are areas in the Park that I have traversed by shallow-draft boat that lend themselves, I think, quite well to the kinds of rustic shelters that National Parks has constructed elsewhere in Canada and does so well. So, I would think some combination of both.

The main criterion I think one should look at, initially at lease, consistent with National Parks policy would be that the labor intensity should be high and it should involve the local people. But I think the opportunities are both inside and outside the Park. Most of the transport would not be by foot in the Park, except in a few areas that we flew over the other day which you yourself are familiar with. There are chances to walk in some places but by and large the area is wet— even when it is dried out it is wet and muddy. So I think we are talking largely about water-oriented experience.

MR. R. P. MALIS

Would you perhaps see one of the requirements as some form of control so that you could in certain areas probably subject these areas to fairly intensive use and yet at the same time control other areas so that a more primitive form of recreation and wilderness opportunity would be important?

DR. S. B. SMITH

I think that would be relatively easy. As I understand the availability of opportunities for people to move into the Park and to avail themselves of different kinds of experiences, it seems to me there is the whole range from fairly intensive to absolutely primitive, so I would agree with you that you could develop. I think it would take a different and imaginative and innovative approach by your officials in the field and your planners to come up with the right mix. I don't think it is going to be quite as simple as I am inferring, that you just sort of lay it out on paper and it happens, but I do think there are other government agencies such as the Canadian government travel bureau and others that might well be involved in trying to get foreign visitors there, because it is a very little known area.

MR. R. P. MALIS

How important do you think it would be to bring about some improvement in the accessibility or the transportation facilities for Chip to enhance the opportunities in the tourist industry?

DR. S. B. SMITH

Well, people that run charter services tell me that 25 people are all you need to make an economical tour. You can hire a DC3— we flew up there last week in a DC3. There is the F27 available, a little more expensive. There are these well-known types of aircraft that have been used in northern Canada for a long time, plus float planes that can land in sheltered areas along some of the channels outside the Park or perhaps, with permission, inside although I would tend to resist that kind of use. But I think that the access really isn't very bad; I don't think PWA could compete very easily with the fares you could get going to Fort Chipewyan because the aircraft don't cost very much for a tour up there.

MR. R. P. MALIS

You don't see a road as a real necessity here at all, or— ?

DR. S. B. SMITH

Well, I hestiate to get trapped into making a pronouncement about a road. I have some friends in Fort Chipewyan who made pronouncements about roads. My own inclination, the older I get and the more I see of Canada changing, is to see less and less roads. I think that roads are an abomination. That's purely my bias.

MR. S. R. BLACKWELL

You commented that the commercial fish picture must be looked at in detail, and I wondered how many people in the delta area and the western end of the lake are presently involved in commercial fishing?

DR. S. B. SMITH

I don't know. Frank Ladouceur is here; he could probably tell us better.

MR. F. LADOUCEUR

About fifty.

MR. S. R. BLACKWELL

Are these all local people?

MR. F. LADOUCEUR

Right.

MR. S. R. BLACKWELL

What do you think to be the maximum potential for the fishery in terms of numbers of additional local people who might be employed?

DR. S. B. SMITH

Well, that would depend to a large extent on the marketability of the product. I think a goldeye smoke fishery could probably employ ten or fifteen additional people. A whitefish fishery, assuming catches on the order of a million pounds per year or so, might well double the potential. There are very few reports available with which one could predict with any real confidence the possible yields of fish out of the Alberta end of Lake Athabasca. One report that I am aware of assesses the situation as high as five million pounds a year; other people say that may be a little generous. But even taking 20 percent of that figure at a conservative estimate of about 10¢ a pound, at a million pounds a year it's not hard to see that the potential is very large. I don't think that we have enough data to know that walleye population, nor do we have enough data to know how hard we can fish it. In all fairness, I guess, it belongs half to Saskatchewan— the fish live on the Saskatchewan side of the boundary for a considerable portion of their lives and they are only in the Alberta portion of the lake for a relatively short time. Yet we fished over 350,000 pounds out of that, what appears to be one population, in the past. That's 175,000 on each side; I am not sure it could stand that, and I don't think anybody knows yet.

MR. S. R. BLACKWELL

How much of the fish catch in the delta area and at the western end of the lake is hauled to the processing plant in Saskatchewan for processing?

DR. S. B. SMITH

Well, for the last couple of years, all of it, wasn't it Frank?

MR. F. LADOUCEUR

Well, yes. This year we brought them down to Hay River part of the summer and then back to Gunnar and now again we are taking them to Hay River.

DR. S. B. SMITH

The situation's a little bit obscure yet because the Fresh Water Fish Marketing Corporation, which is a federal-provincial crown corporation, has had some problems in the last two years in marketing and has lost a substantial sum of money on some fisheries. The far north or remote fisheries where transportation costs are very high have been of particular concern so that we wind up with the unusual situation of shipping fish 300 miles further north, right into the subarctic, for processing for Fort Chip and then flying them all the way to Chicago or somewhere else, or alternately shipping them east 100 miles or more to Gunnar Mine, just west of Uranium City, and then moving them out again by air into Saskatchewan and Winnipeg to the station there. The flow of fish to the Edmonton area where you can't buy fish of any consequence— fresh water fish— has been virtually nil. There are some real problems apparently in transporting and marketing those fish, so it is difficult to make an assessment. Even if one knew the biology of the populations intimately it would be difficult to guess what the potential is.

MR. S. R. BLACKWELL

Is it your feeling that it would be desirable to have a processing plant at Fort Chip?

DR. S. B. SMITH

I don't know. I guess it would be desirable from the point of view of those people who have recommended it so far. I don't know what the situation is. I guess in general I would say yes, it would be desirable, in that anything that can be done to put in that community a vehicle for employing additional people would be desirable. I am not sure that the government could justify it on economic grounds. Maybe these aren't the grounds you want to use. Maybe it would have to be built and recognized as a fixed capital cost with no write-off but one that could bear strong benefits over the years. Being a little bit naive about the costs involved, I would say yes, it would be desirable.

MR. P. J. DOWLING

I am very concerned about the trapping, Stu, whether it is going to continue. We have a generation of trappers at the present time— will it pass on to a younger generation?

DR. S. B. SMITH

Well, some people in Fort Chipewyan say yes, others say no, and they are probably the ones that are more in tune. I would have observed that sleigh dogs were a thing of the past until a Fort Chipewyan boy won the big dog race up in Yellowknife. And now you try and buy a good dog— anywhere from $500. So I think the sleigh dog business rebounds almost immediately either for psychological or monetary reasons. I don't think there would be much difficulty in having a lot of people trapping and having people very interested in trapping, with the shortage of fur the way it was this year and the high prices. I think that there would have been a lot of people making a lot of money.

Predictability in the fur market is really one of the biggest problems. I mentioned earlier today that you can see prices fluctuate from 75¢ at a low, as it was about 1966 or 1967, to $3 or more, $4 in some cases, this spring. That's completely out of the control of the local people. So until some sense is made of handling Canadian furs so that the trapper knows he is going to get paid for them, more than 75¢— some reasonable price for a fur— then yes, trapping will continue.

MR. P. J. DOWLING

Are you suggesting that there perhaps should be a floor price on the muskrats? Do you think that would help?

DR. S. B. SMITH

I don't know. When you start talking about two-price systems and whatnot it is a little dangerous. [Laughter]

MR. P. J. DOWLING

Especially in present company!

When the proper biological conditions have been returned to the delta and the muskrats come back, if the harvest is very very good is it likely to attract trappers from outside the delta?

DR. S. B. SMITH

I don't think so, because in Alberta trapping is done on registered traplines and they are controlled by the person to whom the registration is issued. The same is done in the Park, there are permits issued to people for hunting and trapping specifically in the Park. So no, I don't think that is the problem.

MR. P. J. DOWLING

Is there any possibility that the walleye might possibly adjust over a period of time to another spawning ground— that they will be able to live within an environmental change?

DR. S. B. SMITH

I think it is unlikely. Walleyes, as far as I am familiar with the literature, spawn in muddy to sandy-muddy shallow shorelines with relatively warm water, placid water, and require fairly large rearing areas with a reasonable amount of animal plankton in the water for their larvae before the little fish move back into the less rich areas, as they have to do when they go back into Lake Athabasca. So I don't know of any walleye spawning of any consequence that doesn't take place in delta-like conditions. It is possible they could adjust but I think you would eliminate a fishery for quite a long time before there was any natural selection which would allow them to take over. That has been the common experience with species that are adjusted to particular reproductive ecologies.

MR. P. J. DOWLING

If a commercial processing plant was established at Fort Chipewyan, do you think it could exist without government support or would it require a government subsidy? Have you discussed this with anyone?

DR. S. B. SMITH

We've discussed something like it briefly. I observed earlier just before we came in that the initial capital cost of such a facility might be questionable. I don't know as I haven't looked at it, but once it were in place there is not really much expense involved in operating a relatively high-class dressing station, and that's about what you are talking about. You have to get the fish processed to a point where they can be shipped reasonably, with some reasonable expectation they will get where they are supposed to be going without rotting. You are talking about dressing, packing, icing, generally handling, preventing them from freezing at certain times of the year, in the early spring, so I think it would be a very distinct benefit to the community, and likely could exist at an economic benefit to the fishery.

MR. P. J. DOWLING

My last question might be slightly out of your field, but you may also have a feel for it from your experience with the people living around Fort Chip. When the biological conditions are restored on the delta, how much reliance do you think would have to be placed on welfare programs to sustain the community?

DR. S. B. SMITH

I would hope none. If you look at the kinds of resources that are available to the people there, under a full head of steam and with everybody involved it doesn't take much imagination to see a million dollars a year flowing into that community. At present I understand the welfare bill is something less than half a million dollars, so it is hard to imagine and one would be naive to say that we solved the problem overnight, but it has been my observation that if people have some dignity in what they are doing, they don't need welfare. I think the people there— you were there the other day— exhibit a very strong community spirit and that with some reasonable expectation of employment . . . . Well, I would like to be optimistic and guess that within ten years welfare would be insignificant.

MR. P. J. DOWLING

Thanks very much, Dr. Smith.

DR. W. R. TROST

Stu, the area that we are considering is part inside the Park and part outside it, and the part outside it is the part where the people live. In a way, therefore, we might think of the problems we are looking at as people-oriented problems on the one hand and park preservation problems on the other. Do you feel there is much basic conflict between these two objectives?

DR. S. B. SMITH

No, not in the delta. I think there are obvious ones in almost every other national park we can think of where we have restricted entry or restricted entry points and very intense use, but in a deltaic situation, as I mentioned a while ago, most of the transport is by water and very little evidence of man's passage is left from year to year, so with care and proper handling a delta isn't a fragile ecosystem. That's one beauty of a delta. The primary productivity in terms of what we understand of conversion of solar energy to plant life initially is very high in a delta area and the immense complexity and variability of the delta marshes are the very thing that make them more strongly resistant to ecological damage than any other kind of system we know of. So you could almost say an unqualified "no"— no real conflict.

DR. W. R. TROST

I was perhaps being a bit sneaky there because I wanted to take it back a little bit to the problem we had been discussing before— the decision as to what kind of a control structure should be placed in the system, related to the problem that there might be conflicts in decisions as to what level should be maintained at a particular time. Do you feel that even though there may not be basic conflicts between the in-park and outside-park areas there may still be conflicts as to particular levels or particular time?

DR. S. B. SMITH

Yes, I think there undoubtedly will be, as Mr. Forbes, using the engineering lingo, says, "trade-offs". That used to be a euphemism for destroying things. That's what we were sold for many years. But now I sort of buy the proposition that there are trade-offs, to be serious, because as far as I can tell putting the non-park part of the delta back in a good condition will also result in about as good a condition as we will want or expect in the Park itself. So I don't see any conflict.

I would see more conflicts between maximizing muskrat production and maximizing duck production. The federal migratory bird people might well want to maximize the duck production— muskrats and fish are perfectly compatible; muskrats and ducks might not necessarily be so. There might be some species incompatibility but on a general basis I don't see any really important conflict between the park and non-park areas.

DR. W. R. TROST

You comment that job training might, in that community, be addressed at the objective of keeping people in the community rather than getting them out. Do you want to elaborate a little bit on that thought?

DR. S. B. SMITH

From what people who live in the community have told me, Mr. Chairman, they like the community. Those of us, including yourself, who have been fortunate enough to visit there a few times see a great deal of beauty in the community which is reflected in the strong identification of people with it and there is a particularly strong identification of kids with their families, much stronger than our city kids, I think. I am not a social scientist but I guess that potentially it is dangerous to train kids outside the community, that is you rip them from their families and God knows what kind of strains you put on them. So, my guess is, in the absence of any anthropological data at all and from what my friends tell me, that it is much better to keep them there until they are sure that they want to leave and the only way that is really satisfactory is to have them doing something.

There aren't any jobs for young people in Chip, or very few. In terms of the transportation industry there might be ten jobs around the tugs and so on, and there might be another ten around the airport, but it is not really a big thing. So it seems to me that if we are going to look at technical training for the future of young people who actually were born and brought up in Fort Chipewyan, that the only reasonable way of doing it is to involve them in the community. Train them to do something involving fish or trapping or hunting or tourism or something right there.

DR. W. R. TROST

One of the resources up there that not too much mention has been made of is the buffalo. Do you feel that there is a possibility that buffalo ranching or some kind of game management might make buffalo a profitable operation or a job-producing opportunity?

DR. S. B. SMITH

Well, I'd be pretty reluctant to manage buffalo that have anthrax, and anthrax is in the delta. Spores from anthrax we know can exist in soil for 20, 30, 40 years. It is hard to predict under what conditions anthrax will break out again, so it seems to me buffalo ranching would be a little tenuous because of that pathological problem. It's generally pretty well controlled by the Parks people, who have roundups and vaccinate the animals against it. A healthy herd is going to have calves being born all the time that are possibly susceptible to anthrax, and so I would think it would be difficult to ranch those animals on any scale that would be meaningful.

DR. W. R. TROST

The North is changing quickly now, both to the south and to the north of Fort Chip, and it has been a center of movement for the populations over the centuries. Do you feel that there are good chances for substantial change in that community and in its support base in the short-term future?

DR. S. B. SMITH

Not without a lot of effort. I think local people will have to do a great deal within their own groupings and I think that probably concessions would have to be made by administrative agencies, those that have various jurisdictions outside. It seems to me that the most lucrative things that might happen in there will be quickly taken over by outsiders if there isn't some protection or if there isn't some deliberate effort made to have local people do most of it themselves. There are quite a number of local people involved in various small projects, but the history of northern Canada would suggest pretty strongly that if there is a buck to be made somebody from outside will come in and make it first, because they have managerial skills and they have capital behind them that local people don't have.

So I think it is difficult and I think that there isn't much chance that anything will happen unless that good community spirit is encouraged, and unless there is some kind of a follow-up and they move ahead, sort of anticipating what the course of events might be— if in fact we can successfully restore those water levels and give them access to those resources that they have been using for a long time. But it is going to be a lot of work.

DR. W. R. TROST

But if suitable steps are taken do you think there might be some hope in it?

DR. S. B. SMITH

I only know three remote communities in Alberta— Peerless Lake, Grande Cache and Fort Chipewyan. I can always be wrong, but I'd guess the Fort Chipewyan situation would be more optimistic than the others. I think there is a better unity of purpose in Fort Chipewyan than anywhere I've seen.

DR. W. R. TROST

If that were to proceed and if these changes were to come about, do you think there would be any conflict between those and between the attempts to restore the delta that we are now talking about?

DR. S. B. SMITH

I don't think so. No.

DR. W. R. TROST

Thank you very much, Dr. Smith.

Our next submission is from Mr. D. L. MacLeod. He is making a presentation on behalf of Saskatchewan.

[Mr. MacLeod, in the absence of Mr. Grant Mitchell, Deputy Minister of the Environment for Saskatchewan, here summarized the Saskatchewan position paper, which appears on page 120 of these proceedings.]

QUESTIONING BY THE PANEL

MR. S. R. BLACKWELL

Mr. Chairman, I am a little reluctant to ask too many questions because I know that Dave had a limited involvement in the preparation of this paper. But I would first like to mention that on page 7, fish prices are shown as whitefish 12¢ a pound, pike 10¢ a pound, trout 22¢ a pound. I understand that these prices are in error and they are only useful for comparison purposes.

Turning to the presentation, I wonder, Dave, whether you could expand a little on the hydrodevelopment that has been proposed as a possibility at Elizabeth Falls, in terms of the possible effect that it may have on Lake Athabasca levels.

MR. D. L. MacLEOD

As I understand it, the proposal would utilize storage within the existing historical levels of the lake, that is fluctuations on the lake would be within recorded high and low levels. Under these conditions I would think that over at least a longer term perhaps there would be very very short-term effects, but almost insignificant. The storage on Black Lake is not great and there is something like 100,000 acre feet per foot averages in the top ten feet or so; the average is about 100,000 acre feet per foot. I would think that, in terms of the 30 or 40 million acre feet in Lake Athabasca, that is relatively insignificant.

MR. S. R. BLACKWELL

It was noted that the design question should be left open and I wondered if the proposed weir does not achieve the degree of restorational levels expected, what opportunity there will be to modify the weir. Maybe this question should be directed at Frank Forbes or Jim Card or someone else, but I wondered, for example, if it were decided at a future date that a gated structure would indeed have been better, would it mean building an entirely new structure or could the weir be modified to accommodate gates?

MR. F. J. FORBES

It would be a case of pretty well building a new structure. We may be able to use the weir in dewatering, but in terms of the foundation you would have to pretty near start from scratch again. The weir could be modified to change, say, the average summer level by adding or removing rocks, but if, five or ten years from now, you went to a regulated regime, you would pretty well have to start a new structure.

MR. J. J. KINISKY

When you talk about the annual fish harvest which apparently can get up to about a million pounds a year, what percentage of those fish are actually spawned in the delta area on the Alberta side?

MR. D. L. MacLEOD

It is, as I understand it, primarily a whitefish fishery, but I don't know where the whitefish spawn. Do you know the answer to that one, Gerry?

MR. G. H. TOWNSEND

The major species that spawn in the delta are the walleye and the goldeye. The goldeye aren't fished too much in Saskatchewan but probably a good proportion of the walleye that are caught in Saskatchewan would be spawned in Alberta.

MR. J. J. KINISKY

When we talk about the participation of the Government of Saskatchewan in the design of the control structure which is going to go in there, I would presume that Saskatchewan would also insist on consultation with Alberta in any construction of a power project on the Fond du Lac River.

MR. D. L. MacLEOD

We have a very good working relationship with Alberta, I believe, on all matters related to water and I would guess that there would be certain discussions on anything that came up in Saskatchewan that would affect Alberta's water supply.

MR. P. J. DOWLING

Is there any pressure on your government to supply a road to Uranium City?

MR. D. L. MacLEOD

Not that I am aware of. There is a winter road up the west side of the province as far as Cluff Lake, which is some distance south of Lake Athabasca. I believe that now you can, in the winter, also drive from there to the lake and across the lake, in fact right to Uranium City. I would think that it would be a long time before there is an all-weather road to Uranium City through Saskatchewan, but I am just guessing.

MR. P. J. DOWLING

If there was a road constructed to Fort Chipewyan, would your government be interested in having it extended then to Uranium City?

MR. D. L. MacLEOD

I have no idea what my government is thinking.

MR. P. J. DOWLING

You are not alone. [Laughter]

MR. E. F. DURRANT

In the brief, Dave, it was mentioned that the possibility of better design should be kept open. In what sense is this meant? Does this mean that the process of getting a final design ready and starting construction should be delayed until we have checked out many, many more alternatives or does it mean that we would be well advised to select some solution which can be easily modified if we think that changes are needed?

MR. D. L. MacLEOD

I would think the latter. We did not say a "better design", we said design modifications or consideration of a better control structure than the fixed weir should be kept open. I would think the latter, that if it is possible to build a weir which could be later modified after adverse experience— that is if you find out that it wasn't exactly what you wanted, what you thought it would do it won't do— if you can design a sort of a structure that can be later modified, then do so.

MR. E. F. DURRANT

In your opinion, it is more important to be able to change it than to think you have the right one first until a bunch of coefficients that might— ?

MR. D. L. MacLEOD

I don't think there is any way of knowing that you have the right one the first time around; you are guessing that it is the right one.

MR. E. F. DURRANT

Right.

DR. W. R. TROST

I have two questions, Mr. MacLeod. One has to do with the downstream effects; you mentioned the Slave River and I suppose that effects on the periphery of Lake Athabasca, Fond du Lac and so on would also be in a sense downstream effects. Are you yourself satisfied with the attention that they have been given?

MR. D. L. MacLEOD

I believe in Saskatchewan we made the point that the shorelines don't appear to be significantly affected, so perhaps in that area there has been enough time spent. I am not sure to what depth the downstream, that is the Slave River and so on, considerations have been looked into.

DR. W. R. TROST

The other question is that I wasn't sure where the Elizabeth Falls were located and what connection they had with the water supply in the lake.

MR. D. L. MacLEOD

If you have a copy of our position paper, the lake you see just at the extreme right of the picture is Black Lake. The outlet of Black Lake is Elizabeth Falls— the water falls from Black Lake into the Fond du Lac River.

DR. W. R. TROST

And that is then a water flow into the Athabasca, is it?

MR. D. L. MacLEOD

Well, it flows into the Fond du Lac River, which in turn empties into Lake Athabasca. Actually Black Lake is a widening of the Fond du Lac River and the river starts a number of miles farther south and east of Black Lake and flows through Black Lake.

DR. W. R. TROST

So your interest here, if you want to get power from that falls, is to have the lake as low as possible, is that right, since you will be increasing the height of the falls and consequently the power. That is what I was trying to find out, which way you wanted it to go in respect to that installation.

MR. D. L. MacLEOD

I would suppose that they would want the water up higher so that it would fall farther through the generators and turbines.

DR. W. R. TROST

Then the water is flowing out of Lake Athabasca?

MR. D. L. MacLEOD

No, the water-is flowing from Black Lake towards Lake Athabasca, and the falls are on the outlet of Black Lake, between Black Lake and Lake Athabasca. The water comes out of Black Lake, goes through Elizabeth Falls and into—

DR. W. R. TROST

So the higher Lake Athabasca is the less fall you have in your—

MR. D. L. MacLEOD

Oh! I thought you meant Black Lake. I suppose that would be right.

DR. W. R. TROST

So you are going to drain the lake, is that what you are proposing? [Laughter]

MR. D. L. MacLEOD

No, we have no intention of draining— I hope not!

DR. W. R. TROST

Anyhow, I do see the problem now. I'm sorry, it wasn't clear to me before.

Finally, there was some statement you made in which you indicated that there was a conflict in your position and the position of the Alberta statement.

MR. D. L. MacLEOD

I thought I may have demonstrated it also with the numbers I was using: 100,000 acre feet per foot of storage on Black Lake or, if you like, in the top ten feet of Black Lake there is something over a million acre feet— a million or a million and a quarter acre feet— of storage available. The live storage on Williston Lake, as I understand it, is something in the order of 40 million acre feet; comparison was made in the paper between a mouse and an elephant and that is sort of the way we feel about it. You can't compare the impact or the effect of this relatively small storage in Black Lake, the effect that would have on the delta, with the large storage in Williston Lake and the effect that would have on the delta.

DR. W. R. TROST

And there was a statement of that sort made that was contrary to a sensible— ?

MR. D. L. MacLEOD

Yes, I believe that's the way the Alberta statement reads.

DR. W. R. TROST

Thank you very much for drawing it to our attention. Dr. Smith, did you want to make any further comment on this?

DR. S. B. SMITH

The reference, Mr. Chairman, is on page 30 and Mr. MacLeod clearly talked about run of the river. It is in the last sentence under 7.1.2 and I used the words "any storage". I am aware that run of the river operations don't have any effect downstream. On page 11 I use the words, ". . . any such storage of a significant nature on the major tributaries to Lake Athabasca . . . ." That one is designed to include the Athabasca River in Alberta as well, of course, as I say "any major".

The statement on page 30 could have been clarified to state that any such thing would likely be insignificant or of minor consequence, but I was concerned with storage and I am not so sure that you can simply write off any hydroscheme on any river— at least not from my point of view. I am a fish biologist, and I find some reluctance in accepting a position that you can just write it off as being of no consequence to the animals that live in that river downstream.

DR. W. R. TROST

Until you have looked into that aspect of it?

DR. S. B. SMITH

Yes.

MR. S. R. BLACKWELL

Dave used for comparison purposes a figure of ten feet on Black Lake. I just want to comment for the record that there is no proposal for storage of this amount. The proposal that has been put forward, I believe, is that any variation in level would be within the historical range, so as such this would mean more like two or three feet. Also I have a feeling that maybe the figure of 100,000 feet that Dave used as a surface area of Black Lake is perhaps too high.

The Province of Saskatchewan is looking at the question of a detailed environmental study to assess this proposed development, which would include an assessment of downstream effects and certainly an assessment of the effects of this possible development on the fishery resource of the Fond du Lac and so on.

DR. W. R. TROST

Thank you very much, Mr. Blackwell.

I am very pleased now to call on Dr. Rolf Kellerhals to speak to us on behalf of the *Ad Hoc* Committee of the Science Advisory Committee on the Peace-Athabasca Delta.

[Dr. Kellerhals here summarized his committee's report, which appears on the following pages.]

AD HOC COMMITTEE ON THE PEACE-ATHABASCA DELTA HEARINGS

A sub-committee of the Public Advisory Committee on the
Environmental Sciences of the Environment Conservation Authority

REPORT

1. Introduction

The formation of this ad-hoc committee was initiated by Dr. C.G. Miller, Chairman of the Science Advisory Committee, on June 13, 1973. The committee was charged with reviewing the scientific and technical foundation for the recommendations made by the intergovernmental Peace-Athabasca Delta Project Group. The committee is composed of two biologists, two social scientists, and two engineers, with one of each being a complete newcomer to the problems of the delta.

The committee became active in mid August and has met twice. All members have reviewed the Technical Report of the Delta Project Group and the appendices pertaining to their area of competence. The work had to be done under considerable pressure of time because of the relectance of Alberta Environment to release much of the technical background material until two weeks before the hearings. The material has been available in a form suitable for release for over a year in some instances. We would like to thank the Environment Conservation Authority for having secured its release .

Our report is arranged as follows: The water level and flow requirements of the delta ecosystem are discussed first, then the engineering possibilities for meeting these requirements and finally the social and economic implications of various alternative courses of action.

2. Ecological Considerations

a) General Comments: High biological productivity and diversity are the outstanding features of the Peace-Athabasca delta and the justification for its partial inclusion in Wood Buffalo National Park. Factors lowering these attributes must be considered detrimental.

The Delta Project Group has investigated all major components of the delta ecosystems and in almost all cases the conclusion is that the low levels due to Bennett Dam are detrimental. Very commendable efforts have been made to produce quantitative results wherever possible. In some instances, however, these quantitative results must be considered to have very large tolerances, while in other cases the essential correctness of the results is obvious. Examples of this variable degree of accuracy would be: the relation between carrying capacity of the delta for moose and water levels is highly uncertain because of several poorly defined intermediate steps, such as the relationships between sedge meadows, willows, and water levels; on the other hand, the relation between winter water level and muskrat productivity is reasonably certain as there can be no doubt that muskrats are decimated if lakes freeze to the bottom.

The technical report, unfortunately, fails to take due account of this uncertainty in some of the quantitative ecological results. The water bodies of the delta and their attendant marshes are of two main types:

(i) perched lakes and ponded sections of formerly active channels and

(ii) lakes and channels still connected to active river channels.

Perched lakes are more important in the Peace Delta than in the Athabasca Delta. They have more stable water levels than lakes with connections to major rivers and hence provide more suitable habitat for nesting waterfowl and aquatic furbearers (muskrat, beaver, etc.) To remain productive, perched lakes need to be refilled, or even flushed, every few years. This is one reason for the need to have periodic high flood stages.

Fluctuating water levels and frequent periodic floods are also necessary to maintain the highly productive sedge-marsh association which is the mainstay of the bisons of Wood Buffalo Park. Relatively constant high water will lead to sphagnum bogs while constant low levels favor willows and forest, both of which have much lower biological productivity.

b) Some Comments on Waterfowl: Changes in water levels in the Peace-Athabasca have far-reaching effects in many ways but none more so than the effect on the 1,000,000 ducks and 150,000 geese that use the Delta as a prime area for staging, breeding and/or moulting. Their migratory travels to and from the Delta take them to most of the provinces and territories of Canada and half of the States of the U.S.A. Changes that markedly affect their numbers and habits cause environmental and economic repercussions on a broad international scale. This is because the Delta is one of the few great waterfowl oases in North America. All this Mr. Ed Hennan has pointed out in his well-written and informative report on his studies of the status of the waterfowl in the Delta (Appendix 2K).

According to this report, waterfowl use of the Delta takes two distinct forms:

(i) use as a staging area in spring and fall by transients (in 1971, 430,000 ducks and 145,000 geese and swans).

(ii) additional use as a breeding area or summer refuge for up to a further 500,000 to 1,000,000 ducks.

Water level requirements for these two uses are not entirely compatible:

(i) staging waterfowl require fairly low levels with early successional vegetation stages, wet-fen shoreline and exposure of mudflats.

(ii) staging waterfowl also require, however, sufficient flooding (at a 3 to 5 year interval?) to prevent the encroachment of later stages of vegetation such as willows.

(iii) breeding waterfowl require, for successful production, a steady water level through the nesting period (outside limits: May 1 to July 31).

(iv) breeding waterfowl also require flooding at a quite high level (every 2 or 3 years?) to re-charge the perched lakes, whose margins are widely used for nesting.

The studies of the Project Group were necessarily of a short-term nature. Much more needs to be know about waterfowl usage, particularly in regard to:

(i) food habits of dabbling and diving ducks,
(ii) food habits of geese and swans.

The conclusions of the Technical Report are based on the study of habitat selection and preference, as shown by waterfowl, on the assumption that preferred habitats automatically provide sufficient food material to fill the needs of waterfowl that normally visit the Delta. We do not believe that can be taken for granted under conditions which may cause a marked difference in year to year production of various food plants or may fail to produce an adequate variety of foods for different species (through stabilization of water levels).

Although food availability is not the only factor in site selection it is a critical one and we, therefore, suggest that optimum water-level requirements can only be determined by bioenergetic studies that can estimate:

(i) the quantity and variety of different food sources required by populations of different species of waterfowl,
(ii) the water-levels and changes in water regimes that are best suited to produce the required foods in adequate quantity.

Until some of this information can be worked out in more detail, one can only comment that the conditions prevailing prior to the Bennett Dam seem to have provided a high level of waterfowl utilization over the long-term, though year-to-year fluctuations were at times quite substantial.

The Project Group suggests that the breeding population and the breeding periods are the factors of the highest importance, but we feel that the spring staging period is equally important because very large numbers of waterfowl have to be accommodated at a time when open water and food are generally scarce in other areas. This period of early spring may in fact be quite critical for several waterfowl populations of different species (particularly Whistling Swans) that stage into the Delta on their way north, and we suggest this situation requires more study than it has received to date.

c) Overall Waterlevel Requirements: The ecological studies confirm in general that both the average water levels and the level fluctuations of the natural regime are of great significance and need to be re-established reasonably closely if the delta is to be returned to its former productivity. The crucial question is what exactly is reasonably closely or,by how much can the final level regime differ from the natural one without wide-ranging detrimental effects?

The Delta Project Group has chosen to answer this question by assembling a computer model of the delta ecosystem to evaluate the effects of various possible water level regimes. If this model could be shown to be reasonably reliable this could be accepted as a satisfactory answer to the above question. However, the Study Group has not verified the accuracy of the model and in fact there seem to be serious inconsistencies between the model and other findings of the report. For example, bison carrying capacity is shown to depend heavily on the open sedge and grass meadows of the delta, yet for one particular water level regime examined by the Study Group a 40-45% reduction in the meadow areas is claimed, yet the model predicts no change in carrying capacity for bison.

In our view, while being a commendable effort, this is far too uncertain to provide guidance in the selection of remedial measures. As a result a serious deficiency of the Technical Report is that it lacks a clear statement of desirable water levels.

In our view, desirable levels are as follows:

(i) Winter levels: the present low winter levels are shown to be detrimental to certain fish species and disastrous for muskrat survival. No ecological need for occasional low winter levels has been uncovered so that relatively high and stable winter levels (684-685 ft. AMSL) would appear to be satisfactory.

(ii) Break-up levels: during spring break-up ice jams in the Peace and Athabasca Rivers can cause very high local water levels, resulting in overland flooding and the refilling of perched basins. This phenomenon is of well established significance and needs to be preserved.

(iii) Summer levels: the requirements for summer levels are highly varied and conflicting, as pointed out above for the case of waterfowl use alone. The biologically significant aspects of the summer levels can be discussed under two headings:-

— Fluctuations of Yearly Peak Levels: Historically the peak summer level of Lake Athabasca has varied between approximately El. 684 and El. 693. Very low yearly peaks have occurred infrequently and have no known biological significance. Very high peaks have also occurred infrequently but are of clearly established significance in the re-filling of some of the perched basins. However, the relative importance to the re-filling of perched basins of high summer levels, wind surges and high breakup levels is an important question for which the Technical Report provides no answer. Yearly fluctuations are also known to play an important role in keeping willows from invading the meadows. One can, therefore, conclude that the fluctuations between yearly peaks are significant with the possible exceptions of the extremely low peaks.

— Seasonal Fluctuations during Growing Season: The importance of seasonal fluctuations is emphasized by the Technical Report and there is no evidence providing justification for departing extensively from the natural range. This natural range has been in the order of 3-4 ft., with considerable variations from year to year.

There may well be a certain compensating interaction between yearly and seasonal fluctuations in the sense that some of the past functions of one could be taken over by the other. This, again, is not dealt with in the Technical Report.

The only clearly established facts concerning summer water levels are that the natural water-level regime has, on average, maintained the delta in a state of high biological productivity and that the alterations due to Bennett Dam have had detrimental effects on muskrat and fish, and on bison habitat. Lacking evidence justifying safe departures from natural summer levels, we believe that all the biologically significant features of the summer water level regime, (as outlined above) need to be re-established.

3. The Engineering Studies

The major objectives of the hydrological and hydraulic engineering studies conducted by the Delta Project Group were:

(i) to establish the cause of the recent low water levels and
(ii) to examine the technical feasibility and cost of remedial measures and to propose an appropriate course of action.

The conslusions reached under item (i) are almost identical with the results of several earlier studies, the first being a joint study by the Federal Government and the Peace River Power Corporation, one of the predecessors of B.C. Hydro. Bennett Dam is shown, once again, to affect both the average water level and the range and timing of fluctuations, with the direction of the effects being in an ecologically detrimental direction in both instances. As better data have become available over the last few years these conclusions have changed very little and are now beyond reasonable doubt.

Our main objection to the report concerns item (ii), the study of remedial measures and the proposed course of action. We are of the opinion that several promising possibilities for remedial measures have not been explored and that the final recommendation for a remedial structure is inconsistent with the findings of the ecological studies of the Project Group.

Five possibilities for remedial measures have been examined in some detail, a temporary ice-dam at the outlet of Lake Athabasca, to be built every few years as needed, and gated and ungated weirs on the Slave River and on the Rivère des Rochers. The effects of the remedial structures on water levels are evaluated with the aid of a mathematical model of Lake Athabasca and its outlet channels. This model, unlike the ecological one, has been verified by comparison of computed with observed levels so that the computed levels for situations without weirs can be accepted with confidence. However, there is no justification in the Technical Report for the weir formulas adopted and we are uncertain about the reliability of computed water levels for the remedial weirs.

The ice dam is attractive insofar as it is not permanent, does not mar the landscape, and provides employment in the Fort Chipewyan area. However, the feasibility of such a device is doubtful and it would be unwise to try such a technological innovation on the scale of the Rivère des Rochers. We concur with the rejection of this alternative. The major effects of the other four control weirs investigated by the Project Group are as follows:

(i) Slave River Site: The site has the basic advantage of controlling water levels in the entire delta, but the large size of the Slave River is a disadvantage. The Project Group has assumed that weirs at this site need to be equipped with a navigation lock. There is practically no barge traffic at that location now and we believe that the lock is unnessessary. It would seem that much cheaper facilities could be built to pass the present river traffic consisting mainly of small, outboard-powered river boats.

a) Gated weir: With a gated weir it is possible to closely re-establish natural water levels and flows in the delta and in the major Lake Athabasca outlet channels.

b) Ungated weir: This structure appears to re-establish the natural range of yearly level fluctuations but does not reproduce the seasonal fluctuations closely.

(ii) Rivère des Rochers Site: This smaller river calls for smaller control structures but an undetermined, possibly major, portion of the delta in Wood Buffalo National Park lies outside the zone of influence of a weir at this site. Contrary to the Slave River Site it is impossible here to even approximate the flow regime of the Lake Athabasca outlet channels. Due to the alluvial nature of these channels, this could have severe consequences. The Chenal des Quatre Fourches particularly is endangered by a weir at this site. On average, reverse flow from the Peace River to Lake Athabasca has persisted for much longer periods each summer in the Chenal des Quatre Fourches than in the Rivère des Rochers, and this smaller channel is probably adjusted to significant sediment supplies from the Peace River. The weir on the Rivère des Rochers will tend to eliminate reverse flows almost completely and will replace them with persistent high flows towards the Peace River. This can be expected to cause degradation and widening of the Chenal des Quatre Fourches, a point which has not received adequate consideration by the Project Group.

a) Gated weir: Again with a gated weir natural lake levels can be reproduced almost as closely as desired but with a weir in this location close reproduction requires a large discharge capacity.

b) Ungated weir: Both alternatives considered here, the constriction and the overflow weir increase Lake Athabasca water levels but fail to reproduce the natural seasonal water level fluctuations. The range is reduced from 3 ft. to 0.5 ft. The important high yearly peaks needed to refill some of the perched lakes are also not reproduced.

The alternative (ii-b) recommended by the Delta Project Group for construction, is ecologically the least desirable for two main reasons. The weir might do extensive damage by eliminating the seasonal level fluctuations, whose exact significance is not clearly understood at this stage. A possible 40-45% reduction in meadows is mentioned in the Technical Report. With meadows being one of the main assets of the delta, this alone should justify rejection of this alternative. Another, even more compelling reason for rejection of this alternative is its complete lack of flexibility. A high degree of flexibility is needed because of the uncertainties in the ecological studies, the probable difficulties with the Chenal des Quatre Fourches, and possible future modifications to the flow regime of the main tributaries to Lake Athabasca.

The choice between the remaining three alternatives is difficult:

Alternatives (i-a) and (ii-a), the gated weirs, are ecologically attractive and flexible but major gated weirs are undesirable in a National Park, although their operation would require a permanent crew, again a distinct asset in the vicinity of Fort Chipewyan. The exact manner in which the gates should be operated could become controversial due to the conflicting requirements of different components of the delta ecosystem and we suspect that this is the main reason why the Project Group has avoided the gated structures. We are of the opinion that this is not an obstacle because of the wide consensus that natural levels were reasonably satisfactory. The mathematical model of Lake Athabasca, developed by the Project Group can be used to predict the level of Lake Athabasca, as it would be without Bennett Dam, a few days ahead of the actual date. The gates could initially be operated so that Lake Athabasca would follow the natural levels closely. After some experience has been gained with sequences of high and low levels, it may be possible to simplify the gate operating rules.

Alternative (i-b), the ungated control of the Slave River is ecologically more acceptable than the ungated control on the Rivère des Rochers and would fit the National Park landscape but, again, it is inflexible.

Before a decision on remedial measures is made some other possibilities for controlling water levels in parts of the delta should be investigated, at least summarily. This includes:

(i) Controlled transfer of Athabasca River water to Lake Mamawi via Mamawi Creek.

a) Gated weir: Again with a gated weir natural lake levels can be reproduced almost as closely as desired but with a weir in this location close reproduction requires a large discharge capacity.

b) Ungated weir: Both alternatives considered here, the constriction and the overflow weir increase Lake Athabasca water levels but fail to reproduce the natural seasonal water level fluctuations. The range is reduced from 3 ft. to 0.5 ft. The important high yearly peaks needed to refill some of the perched lakes are also not reproduced.

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Before a decision on remedial measures is made some other possibilities for controlling water levels in parts of the delta should be investigated, at least summarily. This includes:

(i) Controlled transfer of Athabasca River water to Lake Mamawi via Mamawi Creek.

(ii) Controlled re-activation of the Clair and Baril Rivers

(iii) Artifical ice jam formation in the Peace and/or Slave Rivers. This last possibility together with (ii-a), the gated weir, on the Rivère des Rochers might be very attractive since high breakup levels might refill those perched basins which lie outside the zone of influence of a weir on the Rivère des Rochers. There is also a possibility that most perched basins could be refilled at break-up.*

The downstream effects differ little between the four alternative control structures. They tend to isolate Lake Athabasca from the Peace-Slave system and to pass the full detrimental effects of Bennett Dam on downstream. The peak summer levels of Great Slave Lake are now reduced by approximately 0.5 ft. due to Bennett Dam and the four remedial structures investigated cause a further reduction of 0.2 ft. The large surface area of Great Slave Lake is the reason why the effects are smaller there than on Lake Athabasca. The Slave River Delta also appears to be less sensitive to small water level changes than the Peace-Athabasca Delta. However, the navigation on the Mackenzie River is always subject to draft problems and all remedial measures on Lake Athabasca are certain to aggravate that slightly. If possible, all the detrimental downstream effects of Bennett Dam in Alberta and in the Northwest Territories should be corrected under one program.

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* Note that the power development at Fort Fitzgerald is not considered to be a reasonable alternative since the water level fluctuations required by the delta and by a power development are incompatible.

4. Socio-Economic Considerations

a) Community Effects: The findings of the Delta Project Group with respect to local residents in the Peace-Athabasca Delta area are in accord with the findings of numerous other studies of northern native people in Canada. They emphasize in particular:

1. Unemployment and underemployment of the Fort Chipewyan native people.
2. Lack of true mobility on the part of the residents.
3. Large numbers of federal and provincial government departments and agencies, generally exhibiting a lack of any real coordination at both the policy and operating levels.
4. Rapid expansion of such urban amenities as housing, education, health care, social assistance, and community organizations, despite the absence of a viable economic base to support the population.
5. The presence of a wide variety of social problems, aggravated by low incomes, lack of skills, and increasing dependence on social assistance.
6. High cost of living.
7. Isolation.
8. Increasing concentration of native peoples.

Data are presented on the declining economic significance during the past decade of trapping, logging, commercial fishing and barging and mining. Only in the areas of government employment, local business employment and transfer payments have increases in earnings/

payments been noted.

Education is thus far failing to have a contributive impact on this situation because of lack of locally available employment opportunities requiring increased and/or more specialized education, and because successful role models which would motivate emulation are not to be found in the district. As a result, there seems to be a general lack of desire on the part of local children and adults to become educated and to obtain marketable job skills. Dropout rates are accordingly high; even those few who completed all or most of high school find almost no opportunity for challenging employment at their level of achievement in the Fort Chipewyan community. Thus the apathy and disinterest of local children in respect to school are being perpetuated from one generation to another.

The implication of this analysis is that there must be a significant increase in local employment opportunities, particularly opportunities for permanent and more skilled employment if the relevance and attractiveness of education, as perceived by local children, is to increase.

The recommendations made by the Delta Project Group have to do generally with upgrading the local standard of living through community development, increased training of local people in the grasping and exploitation of local opportunities and managing of the small-scale enterprises that this would involve, and generally, proposals for exploitation of all available local resources for the increased employment and income of native people.

Proposals for reviving and protecting the Delta are necessary preconditions for a more systematic harvesting of fish and fur resources and to a lesser extent, to exploiting the tourism potential. These proposals are also beneficial as they would improve the local employment situation directly through employing local men in the construction and operation of proposed water level control facilities and in the monitoring of their effects. Without these programs, the economic decline of the people of the area, as measured in a decline in average per capita earned income in Fort Chipewyan from an estimated $526 in 1965, to $360 in 1970, must be expected to continue.

The direct economic losses may seem small. They represent, however, a major upset to the already precarious balance of household and community economy, and are therefore of major socially disruptive force. Income losses are borne primarily by families in low-income brackets, and penalize most severely those who attempt to live by work and effort, rather than relying on income transfer payments.

b) Rational Choice Guides: The major recommendation, to construct a rock weir at Little Rapids on the Rivière des Rochers, seems to have been arrived at by an implicit "cost-effectiveness" type of reasoning; the structure selected happens to be the cheapest of the alternatives considered. Cost-effectiveness, i.e. the selection of the cheapest alternative, is, however, appropriate only if all of the alternatives produce identical, or at least quite similar, results. In the case at hand, this condition is not fulfilled. The alternatives differ in the effects they will have. This is shown in Table 9.1 and on p. 154 of the Technical Report (lower seasonal level amplitudes will eventually reduce the sedge meadows and Calamagrostis associations by 40-45%). The structure thus chosen seems to just barely acheive certain specifications, but it would not provide any reserve to preserve greater "naturalness" of hydraulic regime should subsequent experience demand, nor does it provide any opportunity to offset future upstream storage projects on the Fond-du-Lac, Athabasca, Smoky and Peace Rivers. (At least two of which are under serious considerations).

The other alternatives presented do in fact differ in anticipated results, in benefits as well as costs. It is suggested, therefore, that the proposed choice be re-considered, and eventually made only after a cost-benefit comparison of overall effects has been prepared. A suggested framework, or a checklist of several types of effects to be included, is appended.

The estimates of annual increased navigation maintenance cost and local revenue and subsistence income losses is in the order of $100,000 - $1,000,000, the capitalized value of which (8% in perpetuity) would be $8,000,000 to $15,000,000 alone. The magnitude of this potential loss should, in itself, justify the investment necessary to construct an effective remedial work.

The estimate of local loss does not include the loss inflicted upon the National Park and upon waterfowl rearing potential. While these losses are intangibles, some components of the value at risk are not imponderables, i.e. they are measurable.

The Project Group might have had reasons not to attempt to valuate quantitatively the reduction of shorelines, mudflats, sedge meadows etc. Any valuation will inevitably be contentious. But such valuations are, in principle, no more speculative than estimates of the future costs and requirements of electricity or furs. Several methods are presently in use to measure the value of recreational, sightseeing and hunting opportunity.[1]

Control theory suggests that optimal control in a dynamic environment requires a certain amount of "leading". Just as the hunter will aim his sight ahead of the quarry in flight, accounting for the movement of the quarry while the bullet traverses the distance, so fixed investments should be planned anticipating the conditions under which the investment will be at work, until another major step is called for. Fisher, Krutilla & Cicchetti(1972)[2] have drawn attention to the fact that the rapidly growing demand for outdoor recreation calls for such dynamic planning. The growth rate in the demand for outdoor recreation (e.g. as measured by visitor days in national and provincial parks) and in willingness to pay (or, conversely, by political discontent with the supposed lack of facilities and foresight of parks management) has been phenomenal in recent years. Only a few days ago the Minister in charge of National Parks suggested that the National Parks acreage, already much increased during the last few years, would have to be doubled once again by the year 2000. (See Edmonton Journal, Sept. 18, 1973). With F., K. and C.[2] we must also accept the fact that the value of essentially non-renewable resources as are preserved in parks, and of which the Delta region certainly is an example, will rise rapidly in the future, simply because man cannot make alternatives. This non-renewable property of natural features is perhaps somewhat perplexing to behold, since we more usually think of forests and fields and rivers to be strictly renewable, thanks to nature's bounties. On the other hand, we do recognize uniqueness and irreplaceability by placing certain features of the country under the special protection of the National Parks Act etc. So it is only consistent to acknowledge this property in conservation decisions in terms of explicit value. While Wood Buffalo is not developed for visitors its value can be compared to the cost of acquiring park sites, and the visitor growth in the National Parks system of Canada as a whole would be an applicable measure of the growth in value.

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[1] a. Clawson, M., Methods for Measuring the Demand for and Value of Outdoor Recreation, Washington: Resources for the Future (1959)

b. Crutchfield, J., Valuation of Fishery Resources, Land Economics, 38, No. 2, (1962)

c. Knetch, J.L., Outdoor Recreation Demands and Benefits, Land Economics, 39, No. 4, (1963)

d. Knetch, J.L. and Davis, R.K., Comparisons of Methods for Recreation Evaluation, in: KNEESE, A.V. & SMITH, S.C., Water Resources, Baltimore, p. 125-142, (1966)

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[2] a. Fisher, A.C., J.V. Krutilla and C. J. Cicchetti, Alternative Uses of Natural Environments: The Economics of Environmental Modification, in Krutilla (1972), p. 18-53.

b. Krutilla, J.V. Natural Environments. Studies in Theoretical and Applied Analysis, Baltimore, (editor), (1972)

Such valuation would also have to take account of the value of the park as a biological reserve (Krutilla, 1967)[3], as a source of national pride and prestige and international goodwill, and the satisfaction which Canadian traditionally derive from evidence of good government.

c) The Equity Principle: In the National context, a project can be deemed beneficial if at least one person benefits and no one looses. (Pareto Optimum Principle). Unfortunately, in reality there are always some losers in any proposition. British Columbia decided, upon formal review of the proposal within its borders , that it is, on balance, beneficial to build Bennett Dam. Claims for the benefit are substantial (Engineering Journal, Vol. 52, No. 10, p. 23, 1969) deriving principally from the promise of holding the cost of electricity constant in the face of general inflation.

Given the capacity of the power station of 2.3×10^9 watt, and a load factor of 0.6, annual energy generation amounts to 1.2×10^{13} watt hours. This is equivalent to a benefit, to British Columbia, of $\$1.2 \times 10^7$ per year, per one mil per kWh of cost saving. Capitilized over 50 years at 8%, this amounts to \$1.5 x 10^8 per mil/kWh.

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[3] Krutilla, J.V. Conservation Reconsidered, American Economic Review, 57:777-786, (1967)

It seems reasonable that British Columbia, which stands to reap benefits in the vicinity of hundreds of millions of dollars for the project, reimburse downstream riparians for damages of two orders of magnitude lower. It is clear that British Columbia's benefits will not be affected greatly by reimbursing the co-operating governments for the cost of remedial measures.

Equity and principles of efficiency demand that damages suffered by innocent bystanders be reimbursed. While the full value of the loss can never be restituted except in kind, the Federal Government's announced intention to bill the province of British Columbia for the cost of downstream remedies is fully endorsed because it is in keeping with the principle of equity and common law, and does not impose unreasonable hardship on the main beneficiary of the Bennett Dam.

d) An Issue that only Governments Can Resolve: The function of government is to do those things which individuals or private associations of individuals cannot do for themselves. The issue at hand contains three elements which are difficult or impossible to be dealt with by individuals:

(i) the adjustment to the negative effects of technological change, i.e. income re-distribution and inefficient resource depreciation effects.

(ii) the allocation of natural running waters between provinces in the best interest of the country as a whole, and

(iii) implementation of the legal maxim that each wrong must have a remedy in situations not explicitly covered by statutory law under the BNA Act.

In a supporting study, Professor L. Shaw describes the complex legal issues that are raised by the Peace River regulation due to Bennett Dam. He demonstrates that Canadian laws had not foreseen the situation that has arisen. In the web of legalities the individual is virtually helpless. Three of the senior governments involved have shown admirable determination to come to grips with the technical issues involved. The good government of the country demands, however, that future conflicts of the type encountered are resolved on the basis of rules of law. Canadians traditionally place great faith in their governments; it remains to be seen whether in cases like the one at issue it will be possible to develop rational, and legally binding procedures which in the case of inter-provincial natural water will:

(i) assure the most rational use and conservation of resources, and

(ii) protect the individual, regardless of his economic power, knowledge, and sophistication, from the arbitrary action of the mighty.

Recommendation #2 of the Delta Project Group (to establish a senior inter-governmental co-ordinating and liaison committee for the Delta region) does not really come to grips with the problem. It will be necessary to establish a negotiated agreement between the senior governments involved, covering the Mackenzie-Peace watershed in the manner of the Prairies Water Agreement. Failing this, the Parliament of

Canada will have to exercise its right and duty to prescribe whatever is necessary to maintain the "Peace, Order and Good Government" for all to see. Ultimately, the ability of the Canadian system of government to adjust to technical change will influence its credibility in the minds of those who put their trust in it.

Related to this issue, we are not convinced that the interests of the Northwest Territories as the major jurisdiction over the downstream section of the watershed, have been adequately considered either by the Delta Project Group, or by the sponsoring governments. The fact that these hearings are only being held in locations where people have little to lose and much to gain from remedial structures points in this direction.

5. Conclusions and Recommendations

(i) While being impressed by the extent of the ecological studies we feel that they were under too severe a time constraint to permit reasonably accurate definition of an ecological model, and we, therefore, cannot accept model-based results, such as Table 9.1 of the Technical Report, as a sound basis for decisions on remedial structures.

(ii) The lack of a clear statement on what would be a desirable water-level regime is a serious deficiency of the Technical Report. We have attempted to remedy this somewhat here. The basic principle should be that natural levels have, on average, maintained the delta in a satisfactory state of high productivity and that, unless there is evidence to the contrary, this is the state which remedial measures should try to achieve. Examination of the Technical Report indicates that not all features of the natural water level regime are of equal biological importance and some may have practically none, hence the exact natural water level regime does not have to be reproduced.

(iii) The importance of the delta to staging waterfowl may be critical in spring and, contrary to the Technical Report, we believe that there is no assurance that the food requirements of these birds can be met in future if unnatural water levels are allowed to persist.

(iv) The importance of flooding due to ice jams at spring break-up may be underestimated. This phenomenon has certainly not received adequate attention. Many perched basins have, in the past, been refilled by this type of flood rather than by generally high lake levels.

(v) The remedial structure recommended for construction is ecologically the least desirable of the four major alternatives which were studied in some detail.

(vi) The proposed course of action lacks flexibility and we believe that both the ecological uncertainties and possible future developments in the Slave River Basin demand a flexible solution. A gated weir would provide this flexibility. The operating rule should be, to approximate computed natural levels on a day to day or possibly weekly basis.

(vii) Several possibilities for affecting levels in the delta have not been investigated and should at least be briefly considered.

(viii) The economic difficulties of Fort Chipewyan are similar to the difficulties experienced by many other northen settlements. However, Bennett Dam has inflicted damage on some residents of Fort Chipewyan and has affected the settlement in general by decreasing certain options for future resource use and employment. Restoration of water levels is a very desirable means of improving conditions insofar as it will permit more systematic resource use, but it is far from sufficient.

(ix) The selection of a remedial structure is based on implied and incorrect cost-effectiveness reasoning. National Park values are not estimated explicitly and ignored implicitly.

(x) Much more expensive remedial works can be justified even with conservative assumptions for the costs associated with the present water level regime due to Bennett Dam. The benefits of a flexible over an inflexible solution need to be considered too in view of the uncertainties of ecological and economic forecasts.

(xi) Principles of equity demand that B.C. pays for the remedial structures. In this context, the selection of a less than adequate remedial structure represents a gamble at the expense of all Canadians and to the benefit of B.C. alone.

(xii) A negotiated agreement for water-use in the Mackenzie Basin is urgently needed.

(xiii) The people of the Mackenzie Valley need to be made aware of the proposed structure and its downstream effects (which are basically detrimental, although probably not very serious) and their consent should be sought before construction begins.

Finally, to emphasize our main conclusions, we believe that the major recommendation of the Project Group is dangerous because of its inflexibility. The proposed structure would improve water levels from what they are now but it would still leave them far from natural. The gated weirs provide flexibile solutions, although it is conceded that flexibility could conceivably be obtained, but perhaps not guaranteed, by other means.

It lies in the nature of our review assignment that this report is critical of some aspects of the Project Group's work. Notwithstanding our criticism, we are impressed by the wide range and depth of studies undertaken by the Peace-Athabasca Delta Project and have enjoyed reading their various reports.

W.A. Fuller	Chairman, Department of Zoology University of Alberta
R. Gerard	Highway and River Engineering Div. Research Council of Alberta
W.H.W. Gunn	President, LGL Ltd. Environmental Research Assoc.
C.W. Hobart	Chairman, Department of Sociology University of Alberta
W.M. Schultz	Assoc. Professor, Department of Agric. Economics & Rural Sociology, U. of A.
R. Kellerhals (Chairman)	Assoc. Professor, Department of Civil Engineering, U. of A.

APPENDIX

A Conceptual Framework for Evaluating Benefits and Burdens of Alternative Actions Proposed for Peace-Athabasca Delta, 1973

A. BURDENS

I. Primary

- (1) Costs
  - (i) construction
  - (ii) maintenance
  - (iii) ad hoc and emergency measures
- (2) Other burdens
  - (i) loss of future options
  - (ii) contingency for unknown effects

II. Associated

- (1) Costs
  - (i) permanent net income loss attributable to loss of resources
  - (ii) loss of productive assets rendered obsolete by action
  - (iii) cost of accelerated re-investment in productive assets
  - (iv) cost of retraining and acquiring new skills
- (2) Other burdens
  - (i) loss of future options (national and local)
  - (ii) planning and re-training effort and loss of acquired skills
  - (iii) disruptive influences on community due to loss of skills, pride, income

B. BENEFITS

I. Primary

- (1) Revenues (none)
- (2) Other benefits a) Canada - Federal Government
  - (i) restoration and preservation of National Park as a national resource, biological reserve, etc.
  - (ii) National parks visitor potential (as measured in terms of cost of acquisition of comparable territory)
  - (iii) value of future options preserved (flexibility)
  - (iv) wildlife habitat
    1. waterfowl
    2. muskrat
    3. beaver
    4. other

(v) fulfilment of obligations to Treaty Indians
(vi) navigation control economies

b) Provinces

(i) decoupling of regulation and power (hydro) production on tributaries from environmental effects in Delta region
(ii) regional development options based on traditional resource base preserved (affected Alberta primarily): tourism
fishing (subsistence, commercial and sport)
hunting and trapping (subsistence, commercial and sport)
(iii) British Columbia: least costly way of remedying damages inflicted by Peace River Project; the savings consist in outlays, administrative effort, political prestige/embarassment, etc.)

II. Associated

(Separation into readily monetized and other benefits not possible at this stage.)

a) Accruing to Canadians in general

(i) option to experience Delta region at a future date (esthetic and recreational value, contingent upon future parks development)
(ii) economic opportunity - that portion accruing from improved rationality, i.e. less wasteful resource use
(iii) satisfaction from good government (equity principle, capability of dealing with new, unforeseen situations, intra-provincial conflict resolution...)
(iv) maintenance of cultural diversity, a foundation of Canadian society, and protection of individual from personally unfavourable effects of collectively desirable cultural-technical changes)

b) Accruing to Residents of the Delta-Western Lake Athabasca Region

(i) maintenance of resource base for hunting, trapping, fishing for subsistence, revenue income and maintenance of traditional skills and lifestyles
(ii) natural resource base as a necessary condition for developing alternatives (even if its monetary value were negligible, development is possible only if foundations of local community are not destroyed before alternatives have been developed

(iii) economic opportunity value (gains to individuals, net of government expenditures) of commercial development relying on natural wealth of Delta region -
  1. tourism and transportation,
  2. outfitting for hunting, fishing, nature experience, canoeing, etc.,
  3. employment in parks administration,
  4. commercial fishing and trapping,
  5. local service opportunity contingent upon the first four...

C. NET BENEFITS/BURDENS

To the extent possible a net sum should be computed for monetary effects, human resource effects, environmental resource effects, and political effects; if values cannot be quantified, they should be at least indexed with the proper sign (+ or -) indicating advantage or disadvantage to the category affected. A presentation could be similar to that presented by Dr. S. B. Smith (1973) - The Peace-Athabasca Delta, a Choice of Water Management Alternatives. The suggested identification, presentation and quantification of effects would complement the above-mentioned presentation viewed from the human-social point.

DEFINITION OF TERMS USED

Primary - benefits or burdens accruing to the principals (governments in this instance)

Associated - benefits or burdens necessarily accruing to persons immediately affected by action of the principals

Benefits - all anticipated advantages that can be indicated (quantitatively or qualitatively/imponderably) and attributed to a particular category of recipients

Burdens - all anticipated disadvantages that can be indicated (quantitatively or qualitatively/imponderably) and attributed to a particular category of recipients

Costs - burdens readily expressible in monetary terms (present value or equivalent annuity)

Revenues - benefits readily expressible in monetary terms (present value or equivalent annuity)

Secondary - benefits or burdens accruing to persons indirectly by transmission through market transactions or taxation/transfer as a result of actions of the principals - not considered in the context of this evaluation framework

Net Benefits/Burdens - the net sum of benefits and burdens, the latter being measured with negative sign. If expressible in monetary terms, the comparison is either in terms of present value of cumulative annual effects, or in terms of an equivalent annuity. - It is recognized that summations ignore important components of benefits and burdens the importance of which must be demonstrated by other means.

[Addenda to the *Ad Hoc* Committee's report were submitted to the Environment Conservation Authority following the hearings. These are as follows:

(1) A submission from Dr. W. M. Schultz. (Pages 265 to 274 of these proceedings.)

(2) A submission from Dr. R. L. Gerard. (Pages 275 to 277 of these proceedings.)

These are labelled as Addendum No. 1 and Addendum No. 2.]

DEPARTMENT OF
AGRICULTURAL ECONOMICS
AND RURAL SOCIOLOGY

THE UNIVERSITY OF ALBERTA
EDMONTON 7, ALBERTA, CANADA
PHONE (AREA CODE 403) 432-4225

October 9, 1973

Dr. Walter R. Trost, Chairman
Environment Conservation Authority
9912 - 107 Street
EDMONTON, Alberta
T5K 1G5

Addendum No. 1

Dear Dr. Trost:

Re: The Restoration of Water Levels in the Peace Athabasca Delta

Allow me to add a number of observations to my statements made at the Hearings on the Peace-Athabasca Delta Project,October 2, and to supplement the report of the "Ad Hoc Committee on the Peace-Athabasca Delta Hearings."

1. I have reviewed my preliminary assessment of the Summary Report of the Peace Athabasca Delta Project group which I communicated to you in February, 1973. After further reflection and especially after having had the benefit of yesterday's presentations and exchanges at the hearings I see no reason to change my preliminary assessment, except in one minor point as noted below. I therefore request that items #1, #2 and #4 of my memo dated February 21 be added to the material submitted to the expanded panel conducting these hearings.

2. My opinion has not changed that the report of the Project Group is a positive one. While I subscribe to the ad hoc Committee's assessment of some of its conclusions, I consider the report constructive, a rich source of factual information relevant to the issue at hand, and without a doubt an excellent way of discharging the difficult task assigned to the Project Group. All the reports issued since do great credit to Mr. Hornby and his staff, the authors of the commissioned reports and the Intergovernmental Liaison Team under Frank Forbes.

3. Regarding item #2c of my February 21 memo, I believe now that alternative ways of assuring co-ordination of the actions of the various jurisdictions in the Mackenzie Watershed are possible, if the establishment of a co-operative management agency with strong administrative powers is not acceptable to the senior governments involved. One alternative would be a combination of a) a mechanism of mutual information on all government actions, and intelligence (information on preliminary plans & proposals, relevant research and surveys), an information secretariat or board, b) a legally binding agreement confirming the protection of provincial and territorial riparian rights consistent with Common Law and the statutory duty of the federal government to oversee inter-provincial transfers, and c) the establishment of a Mackenzie Environmental Protection Fund, which

could be used to offset adverse environmental effects of existing and future hydro-energy, mining and industrial developments within the watershed, and funded by a levy from the developers. (e.g., B.C. Hydro, Saskatchewan Power Authority, Alberta Power etc.). Such an alternative would not limit statutory provincial autonomy as much as a co-operative amdinistration of the waters of entire area, it might be more flexible and would leave the constituent jurisdications free to exercise their own initiative. The federal initiative to establish a liaison committee charged with the exchange of information, as explained by Mr. Durrant at the Hearings, seems to be a step in this direction. But an Agreement and an Environment Fund are necessary to assure protection for the future. A Mackenzie agreement would be somewhat analogous to the Prairie Water Agreement of 1968, suitably modified to meet the special conditions of the Mackenzie. In particular, business should be conducted in public view, and important decisions affecting anyone else but the decision-maker himself, should, as a matter of routine, be scrutinized by an independent body operating under such provisions as those of the Alberta Environment Conservation Act.

4. In regard to future action, the Intergovernmental Liaison Team apparently has expanded on its initial recommendation to "monitor" the ecology of the delta region, and now favours "zone management" to "fine-tune" the hydraulic regime to the requirements of the region. (See Townsend, Appendix I10). There are certainly merits in this proposal. It should not be overlooked, however, that:

a) deliberate flooding of perched basins requires facilities to raise the water; a regulating device which could replicate, at suitable times, and at the "natural" peak levels and charge/discharge rates of the Lake-Delta system, would be essential to zone management.

b) a number of control devices constructed within the Park territory appear to be less consistent with the notion of National Parks as sanctuaries for the preservation of unique natural features in their natural condition (1964 Parks Policy Statement), than a single one at its boundary.

c) no information or recommendations regarding the implementation and cost of a zone management system exist.

5. It is apparent that among the considerations entering the Project Groups' choice between remedial engineering works studied two imponderables played a role: concern for minimal interference in a natural system, and concern about capricious interference with operations to serve special interests. Regarding the concern about interference, it must be emphasized that it was human interference in the first place that faces us with the need for rehabilitation; there must be just enough interference to restore the initial conditions. Since, short of demolishing Bennett Dam, and banning all future development on all tributaries, there is no way of exactly obtaining the natural state in all its ramifications (static and dynamic hydraulic regime, sediment and water quality regimes), a minimum acceptable compromise action would be one which replicates as close as predictable the hydraulic regime, particularly

the seasonal and year-to-year variation in stage level in Lake Athabasca and the communicating waters. The interference argument simply does not apply in the context of the proposed action.

6. The possibility of capricious interference in the operation of a controllable remedial system is indeed "a possible disadvantage" (p. 139, Technical Report). It is a matter of judgment how much weight should be accorded to this argument, however. While certain government and private institutions change indeed faster than the organization charts can be printed, there is abundant evidence that certain institutions, i.e., ideal, man-made structures, show a durability superior to almost any material man-made works. The English Parliament dates back to the middle of the 14th century, the International Joint Commission has performed its duties in the spirit of its establishment since 1909, the British North American Act has been accepted as the basis for Canadian government for more than a century. In order to assure the proper operation it would be necessary to establish operating ground rules, confirm them in solemn agreement, as by contract and Acts of Parliament and the respective Legislatures. While this is not easy, it is possible, the more so since the basis for the operation is to be the Rule of Nature, an authority all of us accept over all laws of mere men.

7. There has been too little concern throughout the study with the effect of possible future developments on the waters that form the Slave River at the junction of the Peace and des Rochers. While this allowed the study project to proceed with the speed indicated by the urgency for immediate remedies, today's actions should not become obsolescent in the next five years (vide, brief of Canadian Water Resources Association). Future developments must therefore be considered in choosing the structure best suited to the requirements 10-20 years hence. Saskatchewan's Elizabeth Falls project was mentioned at the hearings. Power sites on Alberta's Slave tributaries are under continuous review (vide the recent report of the Energy Conservation Board), and have been for upwards of 20 years (Alberta Power Commission, 1951 and 1963 Annual Reports, regarding the Athabasca, and 1965 Annual Report regarding sites on the Smoky and Peace Rivers). British Columbia has firm plans to install further power facilities below Bennett Dam. While the Bennett Dam impoundment has the greatest single effect upon the seasonal distribution of stream flow, every other impoundment will do its part in reducing spring flows. While projects such as Elizabeth Falls may store only a few tenths of a million acre feet, each one of these proposed works will contribute to seasonal flow stabilization. It is now generally recognized that flow stabilization is the major detrimental force that can destroy the delta ecosphere, adapted as it may be otherwise to all vicissitudes of the natural elements. In addition, options for major flow diversion from the Mackenzie Watershed have been studied in detail, and must be viewed as realistic possibilities in the more distant future (Saskatchewan-Nelson Basin Board, Water Supply for the Saskatchewan-Nelson Basin, Ottawa, 1972). In view of these well-documented interests, and intentions it would be responsible to plan with the view of de-coupling the Lake-Delta hydraulic system as effectively as possible from the rivers themselves. The proposed submerged weir relies much to much upon

an adequate supply of spring water from the Athabasca, Fond-du-Lac and the minor direct tributaries to hold any promise of retaining its effectiveness commensurate with its expected physical life.

8. A principal objection to a submerged weir or construction solution is that it provides only for an unnatural slow outflow during the summer, and thus reduces the seasonal stage amplitude during the growing season, presumably the period which has the greatest effect upon plant associations. We view the expected 40-45% reduction in sedge and grass communities (p. 154, Technical Report), the manifest result of the smaller summer stage amplitude (Dr. Townsend), with more concern than the Project Group does. What assurance is there that the replacement, a low-bush willow community with sedge understory will preserve its productivity, will not develop into a dense-bush stage without the bison browse? Will not such a substantial shift in vegetation mix alone change the character of the landscape beyond recognition? - While the ecological simulation model developed by the Project Group is recognized as an ingenious and invaluable device to evaluate water level changes upon the ecosystem, the available knowledge did not permit any estimate of the tolerances, as the author himself recognizes. (Appendix II-O). Only the test of time will tell.

We consider this a strong reason for planning for contingencies, e.g., by means of sufficient design flexibility.

9. Both the need to maintain navigation along the Slave-Mackenzie (Northern Transportation and Chamber of Commerce brief) and the need to preserve the delta region impose finite limits upon the power and diversion potential of the river system. These limits can be stretched by increasing the power of the delta control structure to withhold or discharge water. The ultimate limits are given by the quantity of water required to replicate the spring flood stage. A des Rochers structure relies largely upon the direct tributaries (Athabasca etc.) to provide the necessary spring water, and thus would limit the choice of power development on these rivers. A Slave River structure, on the other hand, would make it possible to draw upon Peace tributaries to provide the necessary spring water, thus widening the range of options available on the Athabasca and Fond-du-Lac. The additional cost of building on the Slave thus buys development options. Further in favour of the Slave site it should be observed that the spring flood stage can normally be achieved earlier than on the des Rochers site. It is important to complete spring flushing as early as possible in order to minimize damages to waterfowl breeding. A gated structure with sufficient discharge capacity would be a necessary condition for such a stage sequence, since it requires the increase in discharge as the season goes on, which originally was provided by the lowering of the stage of the Peace. The simulated designs do not seem to provide the variability of discharge rates necessary to replicate natural conditions even now. With additional river water storage in operation it will become even more critical to have the widest possible discharge capacity.

10. The actual process of deciding between alternative courses of action is always subject to sub-conscious influences. The reports of the Project Group have achieved a great deal of lucidity in presenting their rationales for their decisions. In the complexity of effects and countereffects associated with each alternative it becomes even more important than in the "simple" decisions(as to whether or not to build a power plant)that the decision-maker refresh their awareness of the effects by means of such devices as a benefit-burden tableau or a Leopold tableau as used by Dr. Smith in the Alberta Position paper. The absence of such devices for comprehensive summary detracts somewhat from the otherwise exemplary study, and renders it naturally sensitive to even slight shifts in judgment.

11. Regarding Wood Buffalo National Park, one wonders how long Canadians will support the retention of this park on the basis of essentially "vicarious experience" as their return. It would appear that Canadians would support whatever is necessary to maintain the Park in its pre-dam state, if more of them had an opportunity to visit the park. Proposals for opening up the park to visitors have been presented at the Hearing and I would heartily support such efforts. While visitors are potentially a menace to any nature park, zoning, vehicle restrictions, planned tours etc. would go a long way towards preventing some of the problems which the Parks Service encounters in the more accessible parks. As long as Fort Chip does not have a road connection, the number of visitors would remain small anyway on account of travel costs and inconvenience. This should not deter the Service from going ahead with establishing suitable visitor facilities and inviting the interested public to see what's there. For the community, this might be the most important step towards the development of an alternative, yet bio-resource oriented industry.

12. The population forecast for Fort Chip presented in Appendix III-B of the Technical Report requires some scrutiny. It appears that local head counts arrive at substantially higher population estimates than the estimates of the Census of Canada. I have asked the Census office for elucidation of this discrepancy. I enclose a copy of the answer. The question is: what is the relevant population estimate? While one would be inclined to favour the "official" Census count, it is quite conceivable that numerous families residing in Fort Chip throughout the winter would be out in their summer camps by the time the census is taken (May-June 1971).

.../6

The available population counts of Fort Chipewyan are as follows:

Year	Census of Canada	Other	Source
1931	Not available		
1941	441		
1951	466		
1956	304		
1961	717		
1965		1211	Dixon, 1961
1966	1026		
1969		1450	Dixon, 1971
1970		1600	PAD Technical Report, 1973
1971	1122		

During the same period, residents within Wood Buffalo National Park were reported as per Census of Canada as follows:

		of which:	
Year	Wood Buffalo National Park	Sweetgrass Landing	Pakmamutik
1931	23	n.a.	n.a.
1941	42	n.a.	n.a.
1951	36	n.a.	n.a.
1956	143	n.a.	n.a.
1961	96	n.a.	n.a.
1966	231	143	n.a.
1971	186	18	134

Sincerely yours,

W. M. Schultz

W.M. Schultz
Associate Professor

Encls. (4 pages)

cc: Members of Ad Hoc Committee

Statistics Canada Statistique Canada

September 24, 1973

Professor W. M. Schultz
Department of Agricultural Economics
and Rural Sociology
The University of Alberta
Edmonton, 7, Alberta

Dear Professor Schultz:

This is to acknowledge receipt of your correspondence of August 30 and 31 in which you referred to your need for historical data for the Lake Athabasca-Slave River Region. In reply, I am enclosing a number of census documents giving data back to 1921 for some of the places. Since the centres in which you are interested are unincorporated places, data are not available for each place for every census but only for those censuses at which they were identified separately. Otherwise, their population was included with the surrounding municipality. The enclosed material includes a table showing where each place is shown separately in the reference material.

The discrepancy between the census count and the local count for Fort Chipewyan is probably partly due to the reasons you have stated. The census includes only those persons who have a usual residence in a municipality. Persons residing temporarily in an area who have a usual place of residence somewhere else are counted in the municipality where they usually reside. In addition, the census is taken as of a fixed date (i.e., the night of May 31 - June 1, in 1971). It is possible, too, that each count may have been based on different boundaries since Fort Chipewyan is not incorporated and, therefore, has no legal limits.

You will note that the enclosures include a map and descriptions of the Lake Athabasca region that I hope, will be of value to you.

Yours very truly,

D. A. MacIntosh

Miss D. A. MacIntosh
Special Assistant
Census Field

DAM/dah

encl.

received
SEP 27 1973

Ottawa, Canada
K1A 0T7

List of attached reference materials:

No	Title and/or Source
2	Population by census divisions and municipalities; 98-1936F vol I, 1931.
3	Population Unincorporated Villages; 92-528, 1961, 1956.
4	Population Unincorporated Villages and Hamlets; SP-7, 1951, 1941.
5A	Population Unincorporated places of less than 50 persons; unpublished data 1961, 1956.
5B	List of Unincorporated Places in Sask of under 50 persons, unpublished data 1951, 1941.
8	Historical; 92-539, 1901-1961.
9	Lone Pine Indian Reserve (band 201), historical

W.M. Schultz
February 21, 1973

A PRELIMINARY ASSESSMENT OF PEACE-ATHABASCA DELTA SUMMARY REPORT 1972

1. Of the ten specific recommendations, I unconditionally support three -

    #1 - Delta conservation a high priority
    #8 - Impact studies of further developments
    #10 - Make all study information available for future use

    I agree, without major reservations, to recommendations

    #4 - Remove West Arm Quatre Fourche rock dam - when alternatives provided
    #6 and #7 - Continue monitoring and study of specific situations in region,

    I agree, with the following recommendations, but feel that they are too narrow in scope:

    #2 - Intergovermental Committee for Delta Conservation - should be expanded to a Mackenzie Watershed Commission, and include B.C., Yukon and N.W.T.

    #5 and #9 - Government support for development and local consultations - Stress should be laid on fact that local leadership, action and responsibility will be needed -- and is expected by senior governments, as a necessary condition for the success of any socio-economic adaptation to changing local ecological, and nation-wide economic conditions, demand for potential services to be marketed by local populace.

    The only recommendation concerned with construction -

    #3 - To construct a submerged rock weir on Little Rapid site on Riviere des Rochers requires further substantiation.

All in all it is a positive report, and I am pleased to see substantial agreement with some prior opinions voiced by both the PAD Committee, 1970 and by the various contributors to PAD Symposium, January 1971.

2. The report is silent on a number of important issues, like

    (a) The all-important question of liability of provincial governments and their agencies for the effect of any changes wrought unilaterally.

    (b) Necessity for identifying future plans for construction and water diversion on headwaters. System has ample capacity to satisfy conceivable municipal and industrial uses, but power developments which either divert or stabilize flows, and massive diversions, will affect the water regime in the Delta region, and probably downstream as well (cf. "Water Supply for the Saskatchewan-Nelson Basin"). May negate any possible effect of proposed conservation measure.

(c) Points out need for creating a comprehensive planning and regulating agency - a Mackenzie Commission, comprising the signatories to the delta study, plus British Columbia, Yukon and Northwest Territorial governments. This would have to come through major negotiating efforts and legislation in each of the jurisdictions affected. Implementation should not wait for unanimity, though.

(d) The argument "as the Lake goes, so goes the Delta" is correct only as far as the interconnected lakes system of the delta is concerned (Mamawi,Claire, Baril etc.). However, there are grounds to believe that the occasional recharge of the "perched lakes" on higher ground, behind the delta levees etc., occurs only during occasional flash floods due to ice jams on the Peace - affecting the northern parts of the region, the Peace Delta proper, and on the lower Athabasca - affecting the Athabasca Delta (Lone Pine Reserve) proper. Indications (observations of local residents, direction of willows along channels, destruction of regulating dams built in an earlier attempt to protect the delta) are that filling of high level delta areas does indeed occur during episodes of backflow. The water levels must substantially exceed the levels envisioned by the Delta Study group to replensih the perched lakes and pools, which are among the major production areas for muskrat etc.

More attention must be paid to these "transient" phenomena which go virtually unnoticed by conventional hydrological measurement, because they are of short duration. Ice dam at Rocky Point on Peace/Slave may induce and reinforce natural ice jams.

(e) The hydraulic effect of the proposed rock weir on the Rochers river at Little Rapids will have to be further ascertained and confirmed.

(f) Not strictly within the terms of environmental protection, but all-important for local communities: local people must be encouraged, in fact they should be expected, to exercise local leadership, action and exert responsibility for the necessary changes in the economic base of the community. It is strictly 1984-type thinking to consider only technical aid and "consultations" with local people. Limited, but decisive local autonomy must be granted, encouraged and demanded by senior governments!

4. Advice by W. Fuller and R. Kellerhals is cheerfully acknowledged.

MEMORANDUM *Addendum No. 2*

RESEARCH COUNCIL OF ALBERTA, 87TH AVENUE AND 114TH STREET, EDMONTON, ALBERTA.

C.14

TO THE PANEL FOR THE ENVIRONMENT CONSERVATION AUTHORITY HEARINGS ON THE PROPOSED REMEDIAL MEASURES IN THE PEACE/ATHABASCA DELTA

FROM R. Gerard

DATE October 10, 1973

Dear Sirs,

The critique submitted by our Ad Hoc committee set up to evaluate the recommended remedial measures necessarily represents a compromise opinion about items and emphasis that was arrived at over a short period but with which I generally concur. In the hope that it may prove useful I would like to add an outline of my own appraisal and concerns after reading the Technical Report, listening to the deliberations of our committee and attending a portion of the Public Hearings.

I think there are certain definite conclusions that can be reached:

(1) that the Delta is being damaged by the present water regime, and

(2) that despite an admirable effort to quantify the system there are still considerable uncertainties associated with:

  (a) the final quantitative ecological results of even a small departure from the past natural water regime,

  (b) the future behaviour of the Chenal des Quatre Fourches if a control structure is built on the Riviere des Rochers,

  (c) the future development in the various watersheds upstream of the Delta.

Item (1) above makes it paramount that remedial measures be begun as soon as possible. However the uncertainties listed under item (2) would surely indicate that it is prudent to incorporate considerable flexibility in these remedial measures. It is the lack of this flexibility that was our main concern in the committee - a fact which we went to some effort to point out in our critique. A gated structure would provide a large portion of this flexibility and there would seem to be considerable economic justification for the additional facilities.

However I feel it should be emphasised that the proposed weir at Little Rapids will go a considerable distance towards the restoration of natural levels and that there is the distinct *possibility* that it may prove to be sufficient. It is also by far the cheapest* and most convenient measure. If it did prove ecologically satisfactory and the Chenal des Quatre Fourches did not change significantly then the flexibility would only be required to offset upstream developments. It is hardly justifiable to physically incorporate this flexibility at present, at considerable extra cost, for the sole purpose of mollifying developments that are 10 or 20 years in the future - developments that may indeed be carried out by private enterprise. It would also be unreasonable to ask B.C. Hydro to pay the *additional* cost for the flexibility under these circumstances.

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* I don't believe it is valid to justify large, perhaps unnecessary, expenditure by the argument that it is only a small fraction of a much larger investment (e.g. the additional $4 million, or even $20 million, estimates for the gated structures are only a small fraction of the investment in Bennett Dam and hence are unobjectionable). Each situation must be judged on its own merits.

For these reasons the desired flexibility may be better achieved by considering the proposed weir as the first stage of a premeditated stage construction. The weir should be designed with possible modifications, such as the installation of gates, in mind and, most important, the necessary funds required for future modifications or contingency measures should be set aside *now*. If this latter is not done and the weir proves to be unsatisfactory it will make the whole unpleasant procedure of provoking public (government) awareness and committment that much more difficult particularly as there will then be much less obvious damage to point to. Even with the funds set aside its committment will be difficult to achieve. It is for this reason that I am sympathetic with the recommendations of our committee that physical flexibility be incorporated now.

If the weir is constructed as suggested by the Project Group it is essential that construction be followed by an extensive monitoring of the ecology of the Delta and of the readjustment of the Delta Channels to judge at the earliest possible moment whether further remedial measures are required. It should be pointed out that the monitoring of the Delta ecology would not be necessary if a gated weir were constructed and the lake levels returned to natural. Hence the cost of this programme must be added to the cost of the ungated weir, although it is conceded that the side benefits of such a programme would probably make it worthwhile no matter what structure is built.

In the Technical Report and during the Public Hearings the Project Group objected to a gated weir for two main reasons:

(i) that an elaborate forecasting system will be required to define the gate operation required to restore natural levels, and

(ii) that difficulties will arise because of arguments between interested parties on the optimum operation of the gates.

The first objection is not really valid. All that would seem to be required to define the gate operation are water levels on Lake Athabasca and the major tributary streams. The hydraulic model developed by the Project Group could then be used to predict the flow out of the Lake that would have occurred with these levels, in much the same way that it has been used in the report to simulate the past behaviour of the Lake. The gates can then be adjusted to provide this outflow on the day or days involved. Probably such an operational programme can be begun each spring when levels are now generally close to natural without the weir.

There is some validity in their second objection particularly when the feelings of the local community are considered should the restoration of the natural regime decree, for example, general flooding that would be detrimental to the area and the community. Nevertheless this should be the only problem.

The presence of the National Park would seem to require that levels be returned to their natural state and this requirement can be set down as law and enforced. It hardly seems justifiable to claim that a unique natural resource should be harmed just because humanity finds it difficult to reach agreement.

Finally I would like to point out that even with a gated weir at Little Rapids the uncertainties associated with the future behaviour of the Chenal des Quatre Fourches still apply, albeit in a considerably attenuated form. Because of this I am concerned about the efficacy of any structure at the Little Rapids site. Before proceeding with the construction of such a structure much more effort should be made to remove this uncertainty than has been made to date and serious consideration given to the nature and cost of contingency plans should the Chenal des Quatre Fourches, or any of the other channels, begin to readjust in a detrimental fashion.

R. Gerard
Research Officer.

RG/os
cc: R. Kellerhals.

QUESTIONING BY THE PANEL

DR. W. R. TROST

Dr. Kellerhals, before the questioning begins, I think I should place it on record that the Environment Conservation Authority had formally invited the Northwest Territories to participate in the hearings and explicitly asked them if they wished to have hearings held in the Northwest Territories, but they declined in both cases. Julian, do you want to begin the questioning?

MR. J. J. KINISKY

Dr. Kellerhals, supposing that there could be some work done to have a look at the theoretical computer model which they use as a simulation process here and it did turn out that in fact the simulated model was a reasonable one. Would you then be prepared to accept the report a little more wholesomely than you have?

DR. R. KELLERHALS

You are referring to the ecological model, not to the water level model. There are two models in the report, a mathematical model of flows and levels and an ecological model— also a mathematical model which simulates the effects of water level changes on the distribution of plant communities and productivity.

MR. J. J. KINISKY

Let's talk about the model that was used as far as the water flows themselves are concerned. How did your committee feel about the validity of that model?

DR. R. KELLERHALS

We were happy with that.

MR. J. J. KINISKY

All right, and with the biological model that you are talking about now, what was in essence wrong with it? You say that it hadn't been a proven model.

DR. R. KELLERHALS

Well, we feel it's unproven and we feel that there are conflicts between the model and other statements in the Technical Report.

MR. J. J. KINISKY

Are there ways that the biological model could, with sufficient work, be proven?

DR. R. KELLERHALS

Well, it is really a 'first', to my knowledge— maybe you would know better. I don't think this has ever been tried. Dr. Gunn, would you like to say? This has never been tried before so the prediction probably would have to be verified by waiting to see whether it comes true, because these changes are much slower and there are no past data— unlike the case of the levels for which there are past data that you can use. I can't see how it could be verified without waiting and letting the delta maybe go to wrack and ruin in the process.

MR. J. J. KINISKY

When we look at the way the water levels should be according to this computer model as compared to past performances in the delta, do you think that they correspond closely enough so that the water levels are going to be much the same as traditionally, or do you feel that there is too large a departure, say during the staging periods?

DR. R. KELLERHALS

Our feeling is that the proposed structure doesn't approximate the natural levels close enough to really justify its adoption because it to a large degree eliminates the seasonal fluctuations. The levels are kept quite constant during summer and it doesn't ever bring the levels as high as they used to occasionally go naturally.

MR. J. J. KINISKY

Did the committee feel that because of the structure of the weir, you could be actually doing more damage to the delta than is already being done?

DR. R. KELLERHALS

No.

MR. P. J. DOWLING

I am not too sure exactly what your terms of reference were with respect to this paper, but largely in your conclusion and recommendations you have provided us with a critique of the Technical Report. The question that arises, and I realize that you have a committee of substance behind you, is what in your opinion or in the opinion of your committee do you think we should do from here? Where should we go from here?

DR. R. KELLERHALS

First, the terms of reference. The Science Advisory Committee has acted in different capacities. If there have been hearings held where there has been no extensive technical background provided by others, the Science Advisory Committee has tried to do that and is trying to do that now for some hearings. In the case of a hearing such as this one, where there is very extensive technical background material, we have taken our terms of reference as being the job of having a look at this and commenting on it. So that is how this report arises. We haven't taken it as part of our assignment to tell you what to do, we thought that was your assignment. [Laughter]

MR. P. J. DOWLING

We are in a position, of course, of accepting advice from almost everybody.

DR. R. KELLERHALS

Yes, we made quite definite recommendations. We are not happy with the proposed structure at all because of the inflexibility we feel that is built into it. Perhaps I should say that we are not happy with the proposed course of action. The proposed structure could possibly be part of a proposed course of action but it should be modified. I don't think that one should go and dump big rocks into the river that have to be pulled out again if one wants to put a gate in there later on. If one could possibly put a concrete sill at least partially, or things like this.

MR. P. J. DOWLING

Did your committee express an opinion as to which of the sites and which of the proposed structures that were considered might have the best ecological effect?

DR. R. KELLERHALS

Well, there is no doubt about this— that's the gated structure at the Slave. But it is also by far the most expensive.

DR. W. R. TROST

Do you want to call on members of your committee to stand with you so they can speak into the mike?

DR. R. KELLERHALS

Well, it might help because I don't want to act all on my own, if possible. We have had quite extensive discussions and meetings with various people.

DR. W. R. TROST

So if you wish, ask them to come forward.

DR. R. KELLERHALS

Thank you. I may say that I have not read the complete report because I felt that it was getting late and I tried to go through it as quickly as possible.

DR. W. R. TROST

Thanks very much, Rolf.

MR. P. J. DOWLING

I must say to Dr. Kellerhals and his committee that the work that he and his committee have done has provided an excellent critique and I think has given tremendous input into the study of the Technical Report and will give us cause to review it with a most critical eye. I think we should thank them very much. [Applause]

MR. R. P. MALIS

I'd like to just add to what Phil has said. We have just applauded the fine effort that we see in your brief, and certainly from the Parks Canada point of view you have raised a lot of very interesting points and a number of points that we are going to have to consider very seriously through our principal scientific advisors in ecological questions, the Canadian Wildlife Service.

But I would like to ask you one question of a general nature. Would you find the recommended solution perhaps more palatable if this were also related to a very intensive program of ecological monitoring, involved considerably more effort in terms of refining the ecological model and then, depending upon the outcome of this sort of research activity, translated that to something that perhaps would be more acceptable in a regime reflecting a totally natural regime as it existed prior to 1968?

DR. R. KELLERHALS

Basically that is really what we are calling for. We want flexibility. We feel the ecological predictions have very large tolerances, not in all cases but in some important cases, and flexibility could naturally be achieved by setting aside a fair bit of money now and initiating a big program. But we don't really see this as part of the recommendations of the report. The only thing that the report says is to set up this committee with very undefined terms of reference, undefined financial resources. We would like to see more done towards flexibility now than just dumping great big rocks into these rapids that would be very hard to remove later on— something that almost forces a continuous reappraisal of the situation.

MR. R. P. MALIS

I gather that you favor that?

DR. R. KELLERHALS

Yes, we favor that, but this should be more than just a statement setting up a committee to do this.

MR. R. P. MALIS

I understand the recommendation then. Thank you.

MR. S. R. BLACKWELL

I noted that one of the first things you said criticized the Alberta Department of the Environment for not making much of the technical background material available until two weeks before the hearings, and it occurred to me that since the paper is very critical of the Project Group that maybe it would be appropriate— and I can say this a little facetiously, I guess— for the Project Group to be given a few days or a week or two to criticize the paper. But I wondered, in view of what you claim are major inadequacies of the study and in view of what seem to be your conclusion and recommendation, which is more studies, how long these additional studies would take. Have you any idea?

DR. R. KELLERHALS

I don't think we are really recommending more studies, if you read this carefully. We are recommending some studies in some small parts but, for instance with the ducks, we are saying that there would be more studies needed to really define the model and that at the present state of knowledge one can say that the natural regime has produced high biological productivity, so we are really quite happy to go ahead with those things at this stage except for the engineering design of the weir, which I think is in a very preliminary state.

MR. S. R. BLACKWELL

So what you are saying then is that, despite the inadequacies which you feel existed in the studies, the amount of additional study is really quite small.

DR. R. KELLERHALS

If you want to define the ecological model properly, as I said, you would have to go on for many years and I don't think there is time to do that. We felt that the studies are quite wide ranging and have gone into sufficient depth. It has been very good considering the time constraints. Our objection is that we feel the conclusions drawn from the studies are not really in accord with the results.

MR. S. R. BLACKWELL

I have another question related to references on pages 7 and 12. I wonder whether I interpreted the statements correctly. Are you proposing that the control or remedial work should be designed to improve upon natural conditions?

DR. R. KELLERHALS

What we are saying is that much is being made of this problem of how do we operate gates once we have them, and it has been stressed this morning. We feel that this is no real problem if the governments involved agree that we are just re-establishing natural levels. Nobody has objected to them. We say that given enough time and continuous monitoring it may well turn out that we don't need to re-establish natural levels all the time, but could depart from them here and there to accommodate some other people, such as navigation. But initially this should not be done; this should only be done if at a later date a full agreement can be reached that this is permissible.

MR. E. F. DURRANT

I would like to pursue a little the question Mr. Blackwell had about water levels. I refer to page 7 of your brief, and speaking of the Technical Report you say, ". . . while being a commendable effort, this is far too uncertain to provide guidance in the selection of remedial measures." It doesn't come out and make a statement of desirable water levels. As I read the report, the Rochers weir was selected because it came fairly close to restoring natural water levels but not quite the full amplitude. If that is not desirable, is there some way we can arrive at what is desirable now to help us with the selection process?

DR. R. KELLERHALS

We don't know how the Rochers weir was arrived at but our impression was that it was arrived at because, as seen on Table 9.1, it was shown to have very small ecological effects, that it was actually restoring the delta pretty closely to natural productivity, and on top of that, that it is cheap. It doesn't say in the report that these are the reasons why it was adopted but we felt this was probably the reasoning behind it. And this would be correct if one had confidence in Table 9.1.

MR. E. F. DURRANT

From the hearings, and this is the third one we have been at, I understand that the selection was made because the weir as proposed did a pretty good job of bringing back the natural water levels. I think one of our experts that told us this might comment at this point, Mr. Chairman. There seems to be a difference of why this weir was selected and I am very interested in knowing.

DR. W. R. TROST

Perhaps we could continue with the questioning of the present committee and then ask Frank to comment subsequently.

DR. R. KELLERHALS

I'll just emphasize one point, we feel that the weir certainly does come much closer to natural than what is there now. It is a great improvement— we don't argue over this. But of the four alternatives considered, it is the farthest away from natural and it to a large degree wipes out seasonal fluctuations. There is really no clear evidence in the Technical Report that this can be done without great damage.

MR. E. F. DURRANT

Later on in your report, I didn't mark the page, there was a comment that there is no barge traffic of any significance on the Slave River. Perhaps again, Mr. Chairman, after the committee is through, I could ask someone from Northern Transportation Company to comment on that.

DR. W. R. TROST

Yes, I think we have a submission from them and you might ask them when they appear.

MR. E. F. DURRANT

In your brief as well, you said there was inadequate consideration of the Quatre Fourches channel, the effects that the submerged weir might have on that channel. In what way would a gated structure have a different effect?

DR. R. KELLERHALS

Oh, it wouldn't. The gated structure at the Slave would eliminate that problem.

MR. E. F. DURRANT

But the gated structure on the Rochers would have no——

DR. R. KELLERHALS

Well, it might be possible with some operation to do a little bit about it, but to really remedy that situation you may need more structures or have to go to the Slave.

MR. E. F. DURRANT

On page 12 under item B you mention that, with the ungated weir we are talking about, the range during the season is reduced from 3 feet to ½ foot and in looking through the Technical Report I see the range within the season hovering around the 2½-foot mark. I was wondering if I read the graphs wrong.

DR. R. KELLERHALS

That depends on how you take range.

MR. E. F. DURRANT

This was during the growing season, the May-June—

DR. R. KELLERHALS

If you consider the rise in spring as part of the range, you would be right but I don't think there is very much justification—

MR. E. F. DURRANT

Oh, you are talking about the fall after the peak?

DR. R. KELLERHALS

I think this should be fall and exposure of mud flats during the growing season in fall, but that's a—

MR. E. F. DURRANT

So this half foot refers to the fall, after the peak?

DR. R. KELLERHALS

The peak occurs sometime between May and June with that weir, and at this time I don't know if it is growing season up there or not. I have the impression it is probably marginal.

MR. E. F. DURRANT

There is another point that I would like to get clear because of conflicting information. On page 14 of your brief you mention that the Rochers weir would cause a further reduction of 0.2 feet in Slave Lake over and above the Bennett Dam. The best information I could get out of the hydrologic appendix was that it will actually cause an increase in the levels of Slave Lake through the spring and very little change in midsummer and perhaps a one-tenth lowering on the average in the spring, and 0.2 would be close to a maximum effect.

DR. R. KELLERHALS

I just can't comment without reading it again. We thought the figure relevant to navigation was the 0.2 feet. But without going back to the Technical Report I would have to check where we found that. We got the impression that it was 0.5 feet due to the Bennett Dam and the corresponding figure for the weir was 0.2 feet.

DR. W. R. TROST

And that these were cumulative rather than—

DR. R. KELLERHALS

These were cumulative.

MR. E. F. DURRANT

The information in the hydrologic appendix does not correspond with this. I think it would be a good point to note.

DR. R. GERARD

This information here is in the Technical Report— not necessarily the appendix, I don't know about the appendix.

MR. E. F. DURRANT

There is one thing that does puzzle me a little. With all the uncertainties that you have pointed out so very well, things we really don't know about cause and effect here, are we sure enough of ourselves to make a very large investment instead of a staged investment? With all the unanswered problems that you mentioned in your brief, do you feel that it is safe enough to give serious consideration to a very large investment in the face of this uncertainty, or rather do something that would give us ten years of breathing time and then look at the results of monitoring? Which is your view here?

DR. W. M. SCHULTZ

Mr. Chairman, I believe the committee was pretty unanimous that the quantity that is in shortest supply in the plan is flexibility, including the flexibility to add to a minimum investment or minimum course of action at this time or whenever the need arises. However, we have perused the Technical Report very carefully and we don't remember having seen any recommendation, for example, to zone management or to further staged investments if the need arises. We felt it incumbent upon us, therefore, to draw the attention of this panel to the fact that this is not missing, we have proposed this one course of action. We think that it is not an unreasonable expenditure of cold cash to build into a structure a flexibility of wider amplitude or seasonal stage variation at this time. Of course it has to be considered if another technical possibility exists— for example, the construction of a weir that would possibly have foundations in it now. I would assume that up to a million dollars extra spent now to provide foundations for possible future gates would not be lost because it would cost probably a million dollars to get a million dollars worth of rocks out of the river. This is the kind of flexibility that the committee was anticipating should be considered for the future.

I think there is a very serious discrepancy in the report—while we are informed that the animal carrying capacity would hardly be affected by the proposed models, it is also acknowledged that the sedge meadow zone would be declining. Informally I was told by Gerry Townsend that this is due to the fact that the present natural carrying capacity of the sedge meadows is indeed about twice as much as would be needed. But this is the kind of uncertainty which worries us because it may, indeed, be necessary that in the natural unmanaged state an animal such as buffalo needs about twice the carrying capacity that would be equivalent to its strict energetic requirements. This is the kind of question that we feel requires this kind of wider assurance that all the money we might plant down the river now is not wasted completely.

DR. R. KELLERHALS

I'll just add one thing, one has to keep track of the order of magnitude of things. Bennett Dam is a $500 million investment, at least. Whether we spend $1 million, $5 million or $20 million on remedial downstream works, it is a small sum compared to the investment in Bennett Dam.

DR. W. R. TROST

I appreciate very much the criticisms that you have made, the spirit in which you have made them and the time frame in which you have done so. They are going to be very valuable to us altogether.

I would just like to clear up the point that we are questioning. As I take your position, you have done us a good service in pointing out the criticisms that you have raised. To sum up, your position is that, under the time constraints that the delta itself has placed, we should go ahead knowing certain difficulties; but that if we do go ahead we should go ahead with a structure that has more flexibility built into it, such as perhaps a gated weir on the Rochers rather than on the Slave, and that the flexibility should be built in because there are certain questions to which answers are not yet available. Have I interpreted your position more or less correctly?

DR. R. KELLERHALS

I think so, yes, very much so.

DR. R. L. GERARD

Except for one addition. It doesn't necessarily have to be a gated structure, if you could——

DR. W. R. TROST

It could be another structure that has flexibility?

DR. R. L. GERARD

It could be a staged construction as long as you can guarantee that the monies to carry on are available at the outset.

DR. W. R. TROST

Right. And by flexibility in that sense you mean something that you build and then can build on or change, right?

DR. R. L. GERARD

Either a gated weir, which is flexible initially, or you can start the staged construction with the initial weir, with the assumption that it is going to be flexible later.

DR. W. R. TROST

But by flexibility you also mean something that is flexible enough so that you can change the level at which you are controlling the lake systems?

DR. R. L. GERARD

Absolutely.

DR. W. R. TROST

There is just one more question that I must say was bothering me and I am glad you brought it up. It's the question of the reverse flow. If you do dam on Rochers then you may cause reverse flows through connecting links to the Peace and they may become bigger with time and cancel out what you are doing. Did you look at that enough to seriously give an estimate of how much risk there is in that?

DR. R. KELLERHALS

Basically we have not done any computations further than what was in the report. We found that quite satisfactory. But reverse flows vary with the different channels; the Peace River goes past Lake Athabasca at a slope, with the channels taking off at various points, so the upstream channels have reverse flows for a longer period than the downstream channels and in the Chenal des Quatre Fourches the reverse flows have persisted for much longer periods than in the Riviere des Rochers. The situation persists for quite long periods in which the Chenal des Quatre Fourches would be flowing towards the lake and the Riviere des Rochers would be flowing back out. So Chenal des Quatre Fourches is really a delta distributary of the Peace delta while the Riviere des Rochers is an outlet channel of Lake Athabasca.

DR. W. R. TROST

Right.

DR. R. L. GERARD

But we didn't look at the problems of what channel—

DR. R. KELLERHALS

. You mean the problems of sedimentation that I mentioned?

DR. W. R. TROST

Yes.

DR. R. KELLERHALS

We haven't computed anything. I think one could probably, with the data available now, make more computations than what have been done. I think one could possibly estimate sediment transport. It may have been done.

DR. W. R. TROST

In time, it could become the main channel and the other become a minor one.

DR. R. KELLERHALS

Well, that is the danger if the weir is built on the Riviere des Rochers— the Chenal des Quatre Fourches will start growing, there is no doubt about this. I don't think anybody will question that it will grow and it will degrade. The question is, how fast. If it is on a time scale of a thousand years, we are not worried; if it is five years, we are.

DR. W. R. TROST

You weren't able to make a shot at which it was?

DR. R. KELLERHALS

No.

DR. W. R. TROST

Gentlemen, thank you very much. Does any of the committee members want to add comments to what Rolf has said?

DR. W. M. SCHULTZ

Just to correct a typing error, Mr. Chairman. On page 18, fourth paragraph, fourth line, where it says the capitalized value of the local benefit or losses would be between $8 million and $15 million dollars, it should be between $2 million and $15 million.

DR. W. R. TROST

Thank you, we will note that.

DR. W. H. GUNN

I just wanted to follow up Mr. Malis's question. I do think that effects on the wildlife are extremely important and that as you go along with your program of water management, this is going to be your guide as to whether you are being successful or not, so I do emphasize that more research is needed and a very strong monitoring program is needed on the biological side.

DR. R. L. GERARD

Mr. Blackwell made the remark that we were very critical of the Project Group. I don't think that was our intention at all. We were critical of the recommendations, perhaps. I think they did a marvelous job, and if I could have permission to ask just one question of Mr. Townsend, could you put a tolerance on those figures in Table 9.1?

MR. G. H. TOWNSEND

No, that is not possible and furthermore we did not intend them to be used, perhaps, in the way that they have been used. We recognize that there is a considerable degree of variation. What we hoped to do with the model was to quantify some of the subjective conclusions that we came to, and we also considered the variation or intensity of study in terms of the 18-month period we had to do the study and also the degree of refinement necessary to come to one conclusion or another.

For the case of the moose population, the best estimate was approximately 800 animals on the delta, where our initial estimate of the carrying capacity was somewhere on the order of 5,500, and under these conditions plus the fact that under the modified regime there would be a tendency to increase the moose habitat, we didn't feel it necessary to go into much more detail on this particular requirement. As to the bison portion of the model, the reason the model did not agree with our subjective evaluation was that we assigned certain habitats a carrying capacity value, and in this case we assigned the willow or low shrub habitat a value equivalent to the *Calamagrostis* meadow because we felt that the understory of sedge was important to the buffalo. In the model where you get an increase in the willow habitat, you also get an increase in the carrying capacity for buffalo. But it is a different kind of habitat and this is why it was expressed differently in the two parts of the report.

[COFFEE BREAK]

DR. W. R. TROST

Our next submission is by Mr. Frank Ladouceur from Fort Chipewyan.

[Mr. Ladouceur here read the submission of the Athabasca Fish Co-operative, which appears on page 72 of these proceedings.]

QUESTIONING BY THE PANEL

DR. W. R. TROST

These big game and fishing licenses would be different licenses?

MR. F. LADOUCEUR

Two different licenses, yes.

DR. W. R. TROST

Frank, you didn't make any reference here to whether or not the fish co-op wanted a fish processing plant.

MR. F. LADOUCEUR

Well, I was coming to that— yes, we need a processing plant. Just a storage would be feasible for a while, but once the road is open it wouldn't be much use for us because we'll have too many culls. This year we had 32-33,000 pounds of fish that culled on account of a long haul. The fishermen lost all that, you see, so it's no good. It would be a good thing if we had a filleting plant and a freezing plant, and teach the people how to fillet. Employment would be somewhere around 80 people altogether, fishermen and the people that work on the docks.

DR. W. R. TROST

Eighty people?

MR. F. LADOUCEUR

Well, we figured about 80— close to 80. There'll be more fishermen and there'll be about 20 people working in the plant. Each one has his own different job, you see, and it would be about 20 people. This is what we've been after. We've been trying to get a fish processing plant because we can see that we are losing too many fish transporting them by boat and then from there 200-250 miles by truck, and then by the time they reach the plant in Hay River our fish are culled, you see. Sometimes from 1,300 - 1,500 pounds they cull 2,000 pounds, which we don't like to see happen all the time.

DR. W. R. TROST

Why is it culled?

MR. F. LADOUCEUR

There's no cooling system in the truck, no cooling system in the fish packer that we have, you see, and the ice melts and from bouncing around on the road the fish come soft, the bottom part of the boxes, so that's why they cull so many fish. Now, we've been after the government trying to get some money to build a fish plant but we never got the correct answer from anybody yet, as far as I know.

DR. W. R. TROST

Have you gone far enough to know about how much money would be involved to build a fish plant?

MR. F. LADOUCEUR

It's somewhere around $200,000, I think— that would complete everything. We had a guy working on it last fall and I think that with something pretty close to $200,000 it would be completed. I think it's 36 feet by 70 feet, something like that.

DR. W. R. TROST

Frank, you mentioned that you can't fish in the Park. Is there much commercial fishery potential there?

MR. F. LADOUCEUR

We figure we can get about 300,000 to 400,000 pounds of fish out of the Park, of which we can get anywhere from 40,000 to 60,000 pounds of goldeye, pickerel, whitefish and pike. And there's quite a few people from the Park that sure would like to fish, because it's their country and they're used to it. They're not used to the big lake, they're kind of scared or something, so they'd rather fish in the Park. And it seems like the Park doesn't want to let us have commercial fishing in there.

DR. W. R. TROST

I suppose you've talked to them a little about that?

MR. F. LADOUCEUR

Well, actually I haven't talked to them but the Park Wardens said no, I don't think the government will ever let you fish in the Park. Actually, I never talked to them myself but our manager had a good talk with them. He never went to the office, mind you— he talked to the officials.

DR. W. R. TROST

Any more points you want to make, Frank?

MR. F. LADOUCEUR

There are a few things that have been mentioned by the Women's Voice of Fort Chipewyan. We're having a tough time cashing our cheques in Chip, you know, and they asked to get a bank. Sometimes you can't cash a cheque there for a whole week— there's no money. And they talk about a hospital because there are only three nurses there and sometimes there are quite a few people. Somebody gets hurt and there's no doctor. So it would be a good thing if they could have a hospital and a bank. These are the two main things that we would like to see.

DR. W. R. TROST

Have you tried to get a Treasury Branch in?

MR. F. LADOUCEUR

We tried Treasury Branch, we tried Royal Bank, Bank of Nova Scotia, about three or four different . . . . They come and look around— not enough money, they claim. So that's why we didn't get a bank. But there is more money than what they think— Hudson's Bay and the co-op can't handle all the cheques, they're always short of money. Then you have to wait maybe a week before you get the next shipment of money, you see, so you can cash the cheques.

DR. W. R. TROST

What if the people from the Treasury Branch came in two or three days a week, or something like that? Would that help?

MR. F. LADOUCEUR

Well, I think that would help, sure. They had that in mind there for a while and then that's as far as it went.

DR. W. R. TROST

Anything further, Frank?

MR. F. LADOUCEUR

Well, we sent a written submission to the B.C. government for settlement. You know, the fishermen had lost so much, about 40,000 pounds of goldeye a year, so we were three years behind. During then if there had been water the fish could have been spawning— the bigger ones now would have been marketable. They must have spoiled the spawn or something. So for these three years that we lost we could have made quite a bit of money. In our submission we went by the Peace-Athabasca Delta Project report.

DR. W. R. TROST

Are you in any negotiations now with the B.C. people?

MR. F. LADOUCEUR

Not yet, but we will be within a week or ten days. Shortly after I get back I'm going to start work on this and it should be within a week or ten days—— something like that.

DR. W. R. TROST

That's on behalf of the fish co-op?

MR. F. LADOUCEUR

Yes, the Athabasca Fish Co-op.

MR. J. J. KINISKY

I have one question, Frank. If you would up in a situation where you could actually fish in the Park, how much difference would this make in the volume of fish that you would be able to market?

MR. F. LADOUCEUR

Oh, quite a difference. We figured we could harvest 300,000 pounds from the Park.

MR. J. J. KINISKY

And what are you harvesting outside the Park?

MR. F. LADOUCEUR

Well, we must have got about half a million pounds so far this year. Of course we only had one or two boats running all summer. If we had the six boats running we could have had our limit long ago— we would have been finished.

MR. P. J. DOWLING

Frank, for the benefit of the audience here you might let us know just exactly what are the natural or normal seasons for trapping and fishing and hunting.

MR. F. LADOUCEUR

For trapping, certain pelts are open the 1st of November, some the 15th of November, and closed season is the 15th of May, I think it is— the first part of May, some earlier. The fishing starts as soon as the lake is open right until the end of October.

MR. P. J. DOWLING

When does the lake open?

MR. F. LADOUCEUR

Oh, sometimes on the 10th of May it's open, sometimes a little earlier.

MR. P. J. DOWLING

So you come off the traplines and go to your boats?

MR. F. LADOUCEUR

Yes, we start work on the boats and then go fishing.

MR. P. J. DOWLING

Your actual hunting then is interspersed in these seasons, is it?

MR. F. LADOUCEUR

Yes.

MR. P. J. DOWLING

When does the fishery close down?

MR. F. LADOUCEUR

The fishing season closes the end of October, and it's open again on the 1st of December, I think.

MR. P. J. DOWLING

And do you fish through the ice?

MR. F. LADOUCEUR

Well, we did last year, yes, but we didn't succeed— it's just too far to haul by truck to Edmonton. We didn't do too well.

MR. P. J. DOWLING

Where do you trade your skins?

MR. F. LADOUCEUR

Well, sometimes in the fur marketing service in Regina, and in Edmonton for auction sale.

MR. P. J. DOWLING

Do you come out with them yourself, or are they traded on your behalf?

MR. F. LADOUCEUR

We just ship them and they auction them off there.

MR. P. J. DOWLING

I see. And they go under your name, or do they— ?

MR. F. LADOUCEUR

Yes, my name and my license number and everything, each trapper like that. Most of the trappers sell them right in town, right in Chip, but they don't get the price they should get in market.

MR. P. J. DOWLING

Who buys them there?

MR. F. LADOUCEUR

Just the Hudson's Bay.

MR. P. J. DOWLING

I see. Thank you.

MR. R. P. MALIS

Frank, you've given us a pretty good idea of the amount of fish you think you can get out of the Park compared to how much you get out of the lake right now. Do you think that the amount you get out of the lake can be increased quite a bit through more fishing effort?

MR. F. LADOUCEUR

Well, more likely we could but we have to prove ourself that we can take our limit first, and then they can give us an addition to—

MR. R. P. MALIS

I see, you're not taking up to your limit now?

MR. F. LADOUCEUR

Not yet, no.

MR. R. P. MALIS

How much more do you have to go?

MR. F. LADOUCEUR

Well, maybe another 300,000 pounds or something like that.

MR. R. P. MALIS

I see.

MR. F. LADOUCEUR

That's a summer's operation, you know.

MR. R. P. MALIS

Okay, thanks very much.

MR. S. R. BLACKWELL

What is the boundary between the two fishing zones that you mentioned? Is that the provincial boundary?

MR. F. LADOUCEUR

It's in Alberta. They have zone 1, and that's where we fish the pickerel— we use 4-inch mesh, nothing under 4 or over. Zone 1 is closed on the first day of July and then we move to zone 2 by another year at 4½-inch mesh, not less or over. But then later in the summer the fish come on from the south shore, and we follow the fish until we get to the boundary. You know, that makes it tough for us fishermen, that we couldn't fish in zone 1 for a long time, until they finally opened it for us.

MR. S. R. BLACKWELL

This is because of these two differences in the net size?

MR. F. LADOUCEUR

Yes. They should open that zone 1 all summer for 4½-inch mesh, that's what they should have done.

MR. S. R. BLACKWELL

With regard to the proposed weir on the Rochers, if this is built do you think there needs to be something built into this structure that would provide for fish migration?

MR. F. LADOUCEUR

You mean on the weir?

MR. S. R. BLACKWELL

Yes.

MR. F. LADOUCEUR

Well, I don't know really. More likely it would be, because all the fish go upstream in the spring of the year.

MR. S. R. BLACKWELL

You don't know just how many fish go up?

MR. F. LADOUCEUR

No, I don't. I haven't got a clue because I never fish that part of the country. I always fish Lake Athabasca.

DR. W. R. TROST

Frank, you were talking about culls and I know it's been an important problem to you. Under present circumstances about how much of the fish catch does turn out to be in the cull classification?

MR. F. LADOUCEUR

Well, out of let's say at least 400,000 pounds, there is 32,000 pounds culled so far— maybe 33,000.

DR. W. R. TROST

Out of how many?

MR. F. LADOUCEUR

It would be about 400,000 at least.

DR. W. R. TROST

I see, so it's quite an important part of—

MR. F. LADOUCEUR

Right, because we're losing too much money.

DR. W. R. TROST

And that cull is just chucked out?

MR. F. LADOUCEUR

Oh yes, we just go and dump them, that's it. They're not marketable.

DR. W. R. TROST

I think in Fort Chip either you or someone else mentioned the need for having some way of getting over those weirs for your small boats. Do you want to say anything more about that?

MR. F. LADOUCEUR

Well, I have talked to people and they were wondering how they could get through, and I told them I haven't got a clue myself. But there's got to be a way, maybe a winch or a hoist or whatever they're going to put, that people could get through to come up over the weir.

DR. W. R. TROST

I just wanted to have it in the record again here. Frank had made the point fairly clearly at Fort Chip, that it is necessary for some device or some passageway for the boats to go over the weirs or the dams or whatever they may be.

MR. F. LADOUCEUR

That's right, if you have to come the other way by Quatre Fourches you have to go up the Peace and the Quatre Fourches. It would be maybe two hours difference, one way. If you have to return it would be four hours difference, instead of taking a shortcut down to Rochers.

DR. W. R. TROST

Do you want to make any other points?

MR. F. LADOUCEUR

No, I don't think so.

DR. W. R. TROST

Thanks very much. Our next submission is from Mr. Jerry Adams of Fort Chip.

MR. J. ADAMS

I am part of the community of Fort Chipewyan and have worked in this community informing the people about the weir and the proposed hearings. I was very pleased to see the community express themselves at the hearings. I would like to stress there should be action taken on the concerns they voiced. As mentioned earlier this morning, Fort Chipewyan is dependent upon the delta for the income of many citizens. Since the construction of the Bennett Dam the delta has become a very different place. Fort Chipewyan is a responsibility of the provincial government, and should no longer be overlooked.

QUESTIONING BY THE PANEL

DR. W. R. TROST

Jerry was one of the young people who helped to bring out the problems associated with the delta and explain the problems there to the people in the delta, and he was helped by Ed Courtoreille. We just want to say how much we have appreciated the work you have put into it and how big a help it has been to us. Are there questions to Jerry?

MR. P. J. DOWLING

Yes. Could you tell us where you took your schooling? Did you take all your schooling at Fort Chip?

MR. J. ADAMS

Well, I took it up to Grade 9 and then I went to McMurray to take Grades 10 and 11.

MR. P. J. DOWLING

I see. Then, of course, you came back, you're not at school any more?

MR. J. ADAMS

I'm taking a year off.

MR. P. J. DOWLING

I see. What are your plans for the future, if you don't mind telling us— are you going to stay in the community? Are you going to take up one of the traditional ways of making a living on the delta by trapping and hunting and fishing?

MR. J. ADAMS

I think I'll be staying in Chip on and off. I do a lot of travelling in the summer.

MR. P. J. DOWLING

How about other young people of your age? Do they want to stay in the community of Fort Chipewyan?

MR. J. ADAMS

Well, if there was a high school there I think they would.

MR. P. J. DOWLING

Do you think they're unduly influenced when they leave Fort Chipewyan and go to another place, say McMurray or Fort Smith or Edmonton?

MR. J. ADAMS

I don't think so.

MR. P. J. DOWLING

Do you think that has an influence on making them want to leave Fort Chipewyan rather than coming back to it?

MR. J. ADAMS

Well, I think if there was a high school in Chip they'd want to stay.

MR. P. J. DOWLING

Okay, thanks very much, Jerry.

MR. R. P. MALIS

Jerry, do you think the people in Fort Chip feel that there is a good possibility to improve their livelihood in providing services to the public to visit the portion of Wood Buffalo Park that's next to Fort Chip—the delta area?

MR. J. ADAMS

Oh yes, I think so.

MR. R. P. MALIS

How do you think government can perhaps help to bring this about?

MR. J. ADAMS

Well, first thing, I think it should be tourists but I don't think the students out in Chip would go for it, as they said at the hearing. If there is going to be tourism out there we wouldn't want— I don't think I would want, anyway— a road into Chip or out of Chip. You can easily go by boat.

DR. W. R. TROST

Jerry, the Women's Voice of Fort Chip are going to talk to you! [Laughter]

When you were working with the committee and the people in Fort Chip, did you feel you were able to get them interested in the problem in a way that was good for them— so that they knew what was going on and talked about it in a good way?

MR. J. ADAMS

Yes.

DR. W. R. TROST

Was that much work— did you put much work into that?

MR. J. ADAMS

Yes, I think so.

DR. W. R. TROST

Did you enjoy it?

MR. J. ADAMS

In a way, I guess, but I found it boring.

DR. W. R. TROST

Did you? You sound just like my kids! Thanks very much, Jerry.

Our next submission is from Mr. C. W. Pool on behalf of the Canadian Water Resources Association.

[Mr. Pool here summarized the brief of the Canadian Water Resources Association, which appears on the following pages.]

TYPED COPY

BRIEF TO THE HEARINGS ON PEACE-ATHABASCA DELTA
PRESENTED OCTOBER 2, 1973 - EDMONTON, ALBERTA

The Canadian Water Resources Association wishes to compliment the Governments of Alberta, Saskatchewan and Canada for undertaking the Peace-Athabasca Delta Study, under the direction of the Project Director D. M. Hornby and his staff. This is an environmental impact study, resulting from the construction of the W. A. C. Bennett Dam. Like so many similar studies, time and technical data did not permit the type of report required for the Peace-Athabasca-Slave-Mackenzie River system. Also, the information of a detailed nature covers such a short span of years that throughout the report such words as "may be", "could be", "if not properly planned" are frequently found. It is apparent, after careful study of these reports, that the restoration of the Peace-Athabasca Delta, although necessary for the migratory birds, and perhaps some species of fish, should only be considered as an intermediate step.

The instability of such a delta is outlined in the report in its relationship to the anticipated change in the present channel of the Athabasca River. If the Bennett Dam had not been constructed, and the study had not focused on the Athabasca Delta, the report indicates that the Athabasca River would have joined the Embarras River during the 1970s. It is also suggested that, in the not too distant future, the Athabasca River could be expected to flow directly into the Slave River, by-passing Lake Athabasca, and perhaps nature would have completely destroyed the unstable delta, about which the study has been made.

It is also obvious from the study that many other factors could be revealed, if the entire Peace-Athabasca-Slave-Mackenzie system had been included. It shows very clearly that in order for man to protect such historic inheritances as the Athabasca Delta, the river systems must be managed, either to protect it from the actions of man or nature, or to preserve what nature provided for the benefit of man, present and future.

The report deals with many effects of the changes brought about in the elimination of the flooding:

1. Waterfowl: The ducks, geese and swans require this area for various reasons, and it can be maintained or improved by proper management of the Delta. It is impossible to replace what may have been destroyed, but, from the indications of the study, it can be helped by management.
2. Muskrats: The report suggests that the natural muskrat habitat that was, be replaced by muskrat farming. The alternatives should be carefully weighed before commitments as permanent as the Bennett Dam are made for muskrats.
3. Buffalo and Moose: They are not immediately affected by the Delta changes, but "may be" in the not too distant future.
4. Fish: The study deals with the goldeye, walleye, northern pike and lake trout, and their observed life cycle. It does not indicate whether there are alternatives to the annual flooding of the Delta to protect the spawning areas for these fish or not.
5. It deals with the delicate ecosystem in the Delta, and the danger of major changes in the flooding cycle. The unstable nature of the Delta shows the advisability of management of the Delta, in the interests of conservation.
6. Native Population: The problems confronting them did not begin or end with the construction of the Bennett Dam. It is unfortunate indeed if their problems are used to justify construction of works, or maintaining the status quo, or any action that would be taken in this area. The real problems of the Native people are undoubtedly far beyond the scope of this report.

This is an impact study, and indicates the lack of overall planning before the construction of the W. A. C. Bennett Dam. Most important of all, it shows the lack of a Canadian water policy. The Canadian Water Resources Association again requests that such a policy be established without further delay. C.W.R.A. has suggested to the Western Economic Opportunities Conference that the first step to establishing such a policy could be to expand the Prairie Provinces Water Board to include the Northwest Territories, with the Mackenzie River drainage system and northeastern B.C.

The Athabasca Delta Study further emphasizes the necessity for water to be considered an interprovincial commodity that must be handled by interprovincial and national agreements. Commendable cooperation has been developed by Alberta, Saskatchewan and Manitoba through the Prairie Provinces Water Board. We know it is better to have a coordinated effort than unilateral decisions made by one province, without consultation with others who may be affected such as the W. A. C. Bennett Dam.

In line with this, we commend the Peace-Athabasca Study group in initiating the Mackenzie Interprovincial Liaison Committee under Dr. A. T. Prince, and the MIGLC Task Force on information under Mr. E. F. Durrant. The C.W.R.A. would like to further recommend that these bodies be incorporated into the Prairie Provinces Water Board, with the permission of the Governments of the Northwest Territories and British Columbia. This would be a major step towards a Canadian Water Policy, and at the same time the provinces would retain their valued provincial jurisdiction.

The Canadian Water Resources Association recognizes the urgency of carrying out this impact study on the Athabasca Delta. However, we urge all governments to reduce the number of impact environmental studies, and recognize the necessity for creative environmental studies. We need now a management policy for Canadian waters. This can only mean that the status quo is not good enough. In its place we need new types of study, and new fields of research.

The development of Canada's first research and management center at Burlington, Ontario was a great step forward in research and eventual management of the Great Lakes-St. Lawrence water system. The present sutdies on the Churchill River, the Peace-Athabasca Delta, and many others to come, underline the necessity of a research and management center in west central Canada. We should be looking at creative environmental studies instead of more impact studies.

We recommend that the Peace-Athabasca Delta Study be the last defensive impact study, and that all future studies concentrate on futuristic planning, based on the world's and Canada's future; that we act on this future, and stop finding ourselves in the unenviable position of having to react because we have no better method of managing our water systems.

The Canadian Water Resources Association recommends that the control structure be constructed on the Riviere des Rochers as recommended, and that the governments concerned proceed in formulating a Canadian water policy before more temporary decisions are required in similar situations.

QUESTIONING BY THE PANEL

MR. J. J. KINISKY

When the Bennett Dam was being planned, did the Canadian Water Resources Association take any action at that time to ask them to consider some of the downstream results of this act?

MR. C. W. POOL

I would have to say no. I wasn't a member at that time, but I don't think so. Actually at that time we were more interested in southern parts of Alberta and B.C.

MR. J. J. KINISKY

I notice on the last page of your brief that you talk about "creative environmental studies". Would you like to define that just a little more solidly?

MR. C. W. POOL

Well, I think actually your study group that was up here before could probably tell you more about it than I could. What I'm getting at there is this: throughout this study on the Peace River delta and everything you're talking about restoring, there hasn't been time to go in and study the plant life and so forth to the point where they could say, all right now if we put in a controlled weir and we bring the water up two feet we are actually going to have this much more than we had if we had it at a lower level. This is the type of thing, and I'm referring now to going in and instead of saying nature provided us with the best thing that ever happened I think that man can actually improve on what nature provided.

MR. J. J. KINISKY

So in essence you're telling us that we need an environmental inventory so that we know at least where our starting point is?

MR. C. W. POOL

Well, I don't think that you probably have time at this stage, but I think that should be carried on on a continuous basis from now on. In other words, whatever structure you put in there and whatever goes on there should be a continuous monitoring of the delta area, and I agree with flexibility in the structure, perhaps you would have it at a lower level for a certain period and observe what happens at a lower level, not for two or three months but for one or two or three or four years, and by doing so you could probably increase the amount of ducks that actually come out of the delta and the use of the delta for ducks.

You might also, by going into the muskrat farming that was mentioned here, actually produce, say, five or ten times the amount of muskrats that are being produced in the delta without using the same amount of water in the delta, but provide it in another way. These are the types of things. Your report was done in such a short period that the people that did it couldn't get into this. They mention it, but that's all that's done. This should be done in the future and the same could apply actually to your fish. Nature provided the spawning areas— can we improve on them? I don't know, but I think that we should be looking at the possibility of improving on them.

MR. P. J. DOWLING

Can you tell us something about the Water Resources Association?

MR. C. W. POOL

We have members in all provinces of Canada and the Northwest Territories. We're actually a citizen group that was originally interested in the irrigation in the southern parts of the three provinces, but has since expanded into other areas. You can put it in a nutshell: we are interested in the use of water, not the abuse of water. We're strictly non-government, although we have government members. We are actually strictly a citizen group that encompasses a wide area of interests, including power people and including farmers and including fish and game people and so on and so forth.

MR. P. J. DOWLING

How large a membership would you have?

MR. C. W. POOL

About a thousand.

MR. R. P. MALIS

I was interested in your comments, Mr. Pool, on the ability of man to improve on nature and your suggestion of ongoing activity to look into possibilities to optimize productivity levels of certain resources in the delta. How do you or your association reconcile this with the fact that a major portion of the delta lies within a national park and that some of the suggestions you're making are not exactly compatible with National Parks policy?

MR. C. W. POOL

Well, put it this way, your National Parks will not necessarily have the same policy ten years from now. They are not necessarily going to have the policy that they have today, and in the intervening years they will no doubt be looking at what they're doing. I believe that we have to have wilderness areas and whether this is the right one I can't tell you— you may be able to tell me better than I can, but certainly I think our parks have to be managed. and I think that's really what the people in that area are doing. They brought the buffalo in— you can't say that was their natural habitat, they were superimposed. There are no doubt other things; we've heard about the amount of fishing limitations that are in the Park, and so on. You're managing the Park by doing these things, and you're going to have to manage it regarding water whether you like it or not because the decrease of water from the Peace River is not going to do what nature used to do. Therefore now you're in the position that you're going to have to manage that water anyway, so why not manage it to the best advantage of everything that you can think of? And certainly including all the native people.

MR. R. P. MALIS

Well, it's a difficult question, I suppose you're talking about degrees of management here, and I gather what you're suggesting is that in these sorts of instances perhaps our policy should be broader and more flexible to manage in relation to other interests and part interests, or—

MR. C. W. POOL

I think they have to be. You're sitting on a panel right now that contains the people from Alberta, the people from Saskatchewan. Ottawa is going to have to change its thinking because of what comes out of these hearings— the information that you have obtained and the requests from the two provincial governments involved— so you're going to change your management policy. It's strictly evolution, and the Bennett Dam did it for you to some extent.

MR. E. F. DURRANT

Todd, you mentioned that your association had made a submission to the Western Economic Opportunities Conference in Calgary regarding the establishment of an intergovernmental board of some kind for the Mackenzie River drainage system. Did you have any feedback from your brief?

MR. C. W. POOL

No. Actually, if you attended that conference you would know that we were spectators and that it was the cabinet ministers who were doing all the work. They accepted our briefs, circulated them and all we had was a thank you letter which didn't even indicate they necessarily read them.

DR. W. R. TROST

Todd, you made some mention about the desirability of having a Canadian water policy and also some reference to the Mackenzie interprovincial committee and so on. How broad is the scope of the Mackenzie interprovincial committee? We could perhaps ask Fred, too, in respect of the water systems they look at.

MR. C. W. POOL

It is mentioned in the report. I think maybe Fred would have to answer that, because I take it that at this time it is merely being set up as an advisory board. But I think that these things, for example the statement Mr. MacLeod was making regarding the dam in Saskatchewan, have to come in. They should have come in to this group before this date.

You mentioned the Athabasca tar sands— there is no question at all in my mind that there are going to be water demands in the Athabasca tar sands area that are perhaps going to make the weir that's being talked about obsolete by the time it's built. So you can't look at the delta as a little area, you can't focus on that without looking at the broader picture. As far as this board is concerned, maybe Fred could answer that. It's just mentioned in the report, and I have talked to Fred about it, but he knows more about it than I do.

DR. W. R. TROST

Do you want to comment on it, Fred?

MR. E. F. DURRANT

I'll give you a little information, Mr. Chairman, but I haven't been as close to the work of the board yet as I should have been. The board, or I should call it a committee, the Mackenzie Intergovernmental Liaison Committee has been in operation for about a year and a half. It was established primarily to foster exchange of information between the various jurisdictions that have a piece of the Mackenzie River basin so that none of them would be caught napping by potential developments in other jurisdictions and so that they could exchange information on other changes that are taking place.

They had a number of their members and other people prepare some briefs on the status quo within the basin on a number of items and a document on this has been printed, or is about . . . . It's something like your appendices. [Laughter] In addition to that, the committee has named a task force, called the Task Force on Information for the Mackenzie Intergovernmental Liaison Committee, and it is now working in two specific areas. It is looking at the preparation of an information handbook which can be used by water managers in all the jurisdictions, and the idea would be it would be kept up to date. If the preliminary work on this is approved by the parent committee then work would start on it this winter. The other thing that they have under discussion is whether or not there is a need for an information center, where interpretive information as well as factual data can be brought together in one central place within the basin for use by all jurisdictions.

DR. W. R. TROST

In the scope of the Mackenzie basin do you include the lakes that feed into it, and headwaters of the tributaries?

MR. E. F. DURRANT

The Mackenzie basin includes all that land area and lake area which eventually drains down into the Mackenzie and out to the sea.

DR. W. R. TROST

From the mountains.

MR. E. F. DURRANT

Right.

DR. W. R. TROST

And are all the jurisdictions involved geographically also involved in your group?

MR. E. F. DURRANT

Yes.

DR. W. R. TROST

Excellent. Mr. Pool, you've had the opportunity which I'm sure you'll agree with me was rather interesting, to listen to the submissions made today. Do you want to comment on the critique prepared by the Science Advisory Committee, since that seemed to me an interesting document.

MR. C. W. POOL

I did have some questions myself when I read through the report, but not having first-hand knowledge of the delta I wondered whether I should comment on it. Hearing that and also, as I mentioned before, your comments on the tar sands and the comments on the dam in Saskatchewan, it brings more doubt into my mind as to whether there is sufficient knowledge at this stage to do more than put in a provisional structure, something that is not going to cost too much, and you can actually then assess what is going to take place in the future. It wasn't obvious to me in the report that it took in what can happen above it in the Athabasca, and what can happen above it in the Peace, because actually I understand that the original W. A. C. Bennett Dam called for twinning, you might say, at a lower level, which actually complicates things again.

So really you have not necessarily taken all these things into account, and therefore any structure that you put in now should be something that can be considered short term, because I think you're going to have to say to the people at Fort McMurray, "Sorry, you can't have any water." This is going to be pretty hard for a government to do if they want to develop the tar sands. Right now there's no question you've got to do something to save the delta, but as to what you do I still have doubts in my own mind.

DR. W. R. TROST

Have you moved any towards the position that it should be a flexible kind of an installation?

MR. C. W. POOL

Listening today, I would say yes, very definitely, because if your tar sands proceed almost immediately a fixed structure may be obsolete in five years.

DR. W. R. TROST

Do you feel that there has been enough attention paid to possible downstream effects in the—

MR. C. W. POOL

No, I don't. I haven't read anything in the report, and what I've heard here today is very minimal, and that's again why I was interested in the total picture. Really you were just looking through a telescope at one piece of the Peace-Athabasca system.

DR. W. R. TROST

Thank you very much.

Our next submission is from Mr. Jim Parker on behalf of the Historical Society of Alberta.

[Mr. Parker here summarized the brief of the Historical Society of Alberta, which appears on the following pages.]

Historical Society of Alberta

Box 4035
Station C,
Calgary, Alberta.

October, 1973

THE PEACE-ATHABASCA DELTA

Hearings

I. The Proposal:

That appropriate provincial governmental agencies and the appropriate federal government agencies undertake to sponsor a cultural heritage program for this region.

II. The Situation:

This region has been continuously occupied by white men since 1778 when Peter Pond, aided by native people, found his way to what was the fur eldorado of the northwest. The intervening years have marked a decline in the natives ability to understand their culture. White man's ways have eroded native culture and traditions to the extent that today the present generation does not have a knowledge of its past. The key to an understanding lies along rivers and trails long since forgotten. In the past century there has been so much misinformation and misinterpretation that Indian and Metis people and their children have lost their cultural values.

Today, another eldorado is found in the tar sands: will the present generation here continue to see their cultural values washed away like the sand from the mixer?

I submit that we white people must accept our responsibility not only in providing vocational training on how to bulldoze a mound of earth, but by providing a means to these native people to discover the past which has shaped their culture. They are not immigrants from another land, who can preserve cultural values brought with them, they are people who had their heritage destroyed by newcomers. We must assume the responsibility of working with them to restore their rightful heritage.

III. Participation Planning:

The following groups would be involved:

A. Indian Band Councils and Metis Associations.

B. Representatives from, and selected by, local communities.

C. Governments

D. Expert consultants.

IV. Program Establishment:

A. A Committee would be selected from III A and B.

Comment: The establishment of this Committee could follow the legislation of the Alberta Heritage Act, specifically section 7.

B. The Committee would consult expert consultants who come from various agencies e.g. the Provincial Museum, University disciplines (Anthropology), and the Boreal Institute. From this consultation the Committee would,

1. establish priorities
2. determine a budget
3. develop a program for
    a. field projects
    b. training and education

C. The Committee would:

1. select personnel from
    a. local communities
    b. expert consultants

D. Appropriate governments would establish total funds available in a given fiscal period.

E. Expert consultants would:

1. provide leadership and guidance for
    a. field projects
    b. training and education in the communities

V. Benefits:

A. The native people will learn more about the historical forces which shaped them.

B. They will become partners in preserving a common heritage.

C. This sadly neglected region will be at long last examined and interpreted for its historical value.

D. The program will provide for a meaningful employment in the region.

e.g. there are probably two dozen historical-archaeological sites in the region north of Fort McMurray.

E. Local heritage projects can be developed and maintained in the region.

e.g. museum,
reconstruction of Fort Chipewyan

F. Alter the local people become trained and proficient in heritage projects, they may be used in further development of heritage programs in other regions of the province.

Conclusion:

We know that the unique way of life of these people has been disrupted for centuries by the encroachment of white men. Bricks, mortar, and gigantic tar sand towers may assist in putting bread on their tables (heaven knows they need this) but, they hunger after an equal opportunity to discover and maintain their cultural heritage. To quote the words made by our Honorable Premier at the opening of Abraham Lake,

> ...when we take away the historic background and land of these people, we must present them with alternative opportunities...

The Edmonton Journal, p.1
September 26, 1973.

I say, let the people of Alberta give them an opportunity to preserve their heritage and build a better way of life.

Respectfully submitted,

James M. Parker,
Past President

QUESTIONING BY THE PANEL

DR. W. R. TROST

Thank you for this interesting submission. At Fort Chip one of the strong submissions made by the Women's Voice of Fort Chipewyan was that a museum be built in Fort Chip. Had there been any discussion to your knowledge with the Alberta Historical Society or with the Alberta Archaeological Society about this with those people, do you know?

MR. J. M. PARKER

No, not with the Women's Voice of Fort Chip. There have been some informal discussions about this, but I think I should stress that the impetus I believe should come and should be controlled by the local people, and I am delighted to hear that such a submission was made.

DR. W. R. TROST

They were keen on it. Has there been any development again to your knowledge either under the auspices of the Provincial Museum or of the National Museum in respect of restoring or maintaining that center, Fort Chip, as a historical— ?

MR. J. M. PARKER

Their surveys have been made by the provincial Historic Sites Officer under the Provincial Museum and Archives. Surveys of sites have been made; they were made three years ago. The National Historic Sites and Monuments Board, which comes under National Parks, has had archaeological parties— summer parties— in Fort Chipewyan locating and digging some of the original sites such as Nottingham House in English Island, and they also dug a site on the south, the old Fort Point on the south side of the lake, so certainly there is some interest here. I think there has been some recognition by the federal government of the national importance of this area in historical terms, and the provincial government also has begun to recognize this, but I think it should be stressed at such a hearing as this that there is an opportunity here for stable, meaningful employment in these lines.

DR. W. R. TROST

Thank you very much. Are there questions from the panel?

MR. S. R. BLACKWELL

Your proposal speaks of a cultural heritage program for the region. What do you mean by the region— would this be broader to include Saskatchewan?

MR. J. M. PARKER

Yes, I did have you in mind in the sense that when you consider the archaeological sites, although I'm more familiar with the fur trade sites, there are Indian sites north and east of Fort Chipewyan. When I said "communities" rather than "community" it was because many of the communities along the lake within Saskatchewan I think should seriously consider this too, but I suppose really the main thrust would be Fort Chipewyan which is recognized as a site of national importance, and it's really more between the Alberta government and the federal government in this area.

DR. W. R. TROST

Thanks very much, Jim.

Our next submission is from Mr. G. R. Hampton on behalf of the Northern Transportation Company Limited.

[Mr. Hampton here read the brief of the Northern Transportation Company Limited, which appears on the following pages.]

TYPED COPY

BRIEF TO THE PUBLIC HEARINGS ON THE PROPOSED CONTROL STRUCTURE ON THE PEACE-ATHABASCA SYSTEM

Submitted by
NORTHERN TRANSPORTATION COMPANY LIMITED
October 2, 1973

In November of 1971 Northern Transportation was asked to sit on the Navigation Sub-Committee of the Peace-Athabasca Delta Study. From this request and the meeting of November 7, 1971, we submitted tonnage figures from past years and expressed our views on the future outlook. However, for the moment let us go back to January 1961. Northern Transportation expressed their concern to the Annual Conference on Improvements to the Athabasca-Mackenzie Watershed. From a general discussion at their conference the following resolution was adopted by those present.

> "That the meeting has noted the possible detrimental effects to navigation on the Peace, Slave, Athabasca and Mackenzie Rivers from the proposed Hydro-Electric Development on the Peace River above Hudson Hope, B.C., and requests that the various Government agencies concerned take the necessary steps to ensure that any such development is so operated, both in the construction phase and thereafter, that the present and future navigation requirements on the said Rivers are adequately protected."

This resolution was carried forward each year with various wordings until January 1966, at which time the conference felt that protection was being given to downstream navigation.

In 1971 when we were invited to be a part of the Sub-Committee our main concerns were:

1. As there had been serious erosion to the banks of the Athabasca at Mile 141 and that with continued erosion there could be a breakthrough of the Athabasca into the Embarras River. In this event what would the downstream effects be on marine navigation.

2. In the planning of dams or weirs in the channels north and west of Fort Chipewyan, that assurance be given that a navigable route remain open to the Slave and Peace Rivers.
3. In the event a dam was placed across the Riviere des Rochers, would there be erosion of the banks of the Quatre Fourches, to the point where this outlet would be lost into the large flats to the north and northeast.

From the above three items, number one has been partly stopped with the cutting of a by-pass. However, the by-pass could create problems in future years.

For those that may have the Technical Report on the Peace-Athabasca Delta Project, please refer to page 129. You will note that the diversion channel is angled downstream. This slows up the process of eroding the diversion channel to a width and depth sufficient to get a large tug and tow through. In the meantime. the main river channel is closing off on the downstream side. Will this sequence of events close off the river to navigation?

Items 2 and 3. As these are related the effects on the Chenal des Quatre Fourches will not be known until some years after the dam or weir has been constructed. However, in our opinion there will be a much larger volume of water flowing through this channel with a possible bank erosion in some areas.

How assured can we be that there will not be a breakthrough of the Quatre Fourches into the lakes and flats to the north and northeast.

Thus other items come to mind at this time. Will the closure of the Rochers River be detrimental to the floodwaters of the Peace moving into Lake Athabasca and what percentage of loss can we expect.

Secondly, will this closure of the main drainage source have any effect on the levels of Great Slave Lake; if so, how much?

As Great Slave Lake is the control source for Providence Rapids in the Mackenzie, it is very important that Slave Lake retain its levels.

To sum up our brief, a navigable channel in the Athabasca-Peace and Slave River waterway is essential to the communities and industry.

Captain G. R. Hampton

QUESTIONING BY THE PANEL

MR. J. J. KINISKY

Captain Hampton, what tonnage does NT carry, say, from McMurray up to Fort Chip right now?

MR. G. R. HAMPTON

In this sector we're looking at around 20-25,000 tons.

MR. J. J. KINISKY

And is there any hauling from, say, Hay River back to Fort Chip at all?

MR. G. R. HAMPTON

Not at this time, not to Chipewyan as such. We have inquiries of tonnage being moved into the upper area.

MR. J. J. KINISKY

When you do your hauls from the Fort McMurray area or from Waterways up to Fort Chipewyan, how frequently is this done? Do you have a regular run in there or is this dictated by the demands?

MR. G. R. HAMPTON

It's partially dictated by the demands; however, at the present time we are running two trips a week on the average into the Lake Athabasca region.

MR. J. J. KINISKY

When we were at Fort Chip there was a complaint about the high price of freighting in there. Concerning mainly the price of food, what are the freight costs? We had quotes such as 35¢ for a can of sardines, and I'm sure that barge traffic can't be quite that expensive.

MR. G. R. HAMPTON

No, I believe the rates are $15 a ton at this time— 75¢ a hundredweight.

MR. J. J. KINISKY

When you talk about the barge traffic runninq through there, how deep a waterway is required— how much water do your tugs draw on this run?

MR. G. R. HAMPTON

We require five to six feet normally. We prefer to have more but we can get along with that amount. The tugs only draw three feet of water but with the power they draw all the water out from underneath the boats and they touch down.

MR. J. J. KINISKY

Are there places in the navigation system now where you're having some difficulty because of shallow waters?

MR. G. R. HAMPTON

Well, this again depends on the fluctuation of water levels in the Athabasca sector. In the Athabasca River itself, from floodwaters to a low water stage you can get movement of your channel from one side of the river to the other, and you can get instability in your sandbars. They move around in the river. From one trip to another you may have a complete change.

MR. J. J. KINISKY

There's no trouble at all as far as navigation is concerned in Lake Athabasca itself at this time?

MR. G. R. HAMPTON

No. Lake Athabasca doesn't give us any trouble.

MR. J. J. KINISKY

Has your traditional route to the Slave River been through the Riviere des Rochers?

MR. G. R. HAMPTON

We use the Rochers River on the downstream movement, to Fitzgerald. Late in the fall when the water levels get quite low there is a point where we have to go up and utilize the 'Catfish'— the common name of the Quatre Fourches— and come through that way due to the fall-off at Little Rapids. However, when the freeze-up comes the 'Catfish' normally freezes up first, and if we still have boats below the Little Rapids we have to utilize the two-boat system to get the lower boats back up— winch them back up through the rapids.

MR. J. J. KINISKY

So if they put in the weir and they stop barge traffic through the Riviere des Rochers, when you go through Quatre Fourches there's going to be faster movement through there with the water, and presumably it's going to keep it open somewhat longer?

MR. G. R. HAMPTON

I would imagine so. I'm not . . . . I would say so, yes.

MR. J. J. KINISKY

And is the depth of the water in the Quatre Fourches now sufficient to handle all your navigation needs?

MR. G. R. HAMPTON

The depth of the water is and has always been quite good, let's say, in the river itself. The only problem we have is at the Peace River end. When the changes in elevation come the river channel changes sides—it moves from side to side in the river, one side to the other. There is different directional current flow.

MR. J. J. KINISKY

You say that during the summertime you're running an average of two trips a week from McMurray to Fort Chip. Do those barges then continue on downstream in the system?

MR. G. R. HAMPTON

No, since Swanson's Lumber has moved out of the Park, Chipewyan has been our northern terminus. However, there have been inquiries very recently on moving a backhaul from Fort Smith south.

MR. J. J. KINISKY

I'm wondering, if a backhaul were set up what would be your capability to carry chilled fish, for example, back to McMurray?

MR. G. R. HAMPTON

Well, we are doing this at the present time.

MR. J. J. KINISKY

You're doing that now?

MR. G. R. HAMPTON

Not from Chipewyan, but we are taking 'reefer' barges from the Saskatchewan fishery at Crackingstone Point to McMurray.

MR. J. J. KINISKY

Then they're actually coming past Fort Chip on the way?

MR. G. R. HAMPTON

Well, there's a diversion there of twenty miles.

MR. J. J. KINISKY

Thank you, Captain Hampton.

MR. P. J. DOWLING

Do I understand from the replies you've given to Mr. Kinisky that when the water level of Lake Athabasca dropped you did not have any navigational difficulties in any way?

MR. G. R. HAMPTON

We had navigational difficulties in the Big Point, what we call Big Point channel. This is an annual housecleaning affair, you might say, by the federal Works Department, but their cubic feet of dredging went up considerably at that time. If the low water condition had continued and dropped further we would have had another possibly five to six miles of dredging directly east of Chipewyan.

MR. P. J. DOWLING

Where is the dredge located?

MR. G. R. HAMPTON

It's located at Waterways and then they are closing down first thing in the spring.

MR. P. J. DOWLING

When this dredging is done it doesn't increase the length of your route?

MR. G. R. HAMPTON

This is a continuing thing, each year the channel moves out a certain amount. Your sediments drop at the outer end of the channel, these have to be dredged out and in the process your channel is gradually getting longer out into the lake, meaning more housecleaning for the dredgers.

MR. P. J. DOWLING

The barges stop on a regular basis at Fort Chipewyan?

MR. G. R. HAMPTON

Yes. Whenever the demand builds up we try to continue a trip at least every ten days. We have two trips a week leaving McMurray. However, some are diverted into Uranium City, some may go on into Stony Rapids, Fond du Lac and others terminate at——

MR. P. J. DOWLING

Do you have any docking problems at Fort Chipewyan when the water is low?

MR. G. R. HAMPTON

We did have during the low water periods of 1971. We had to utilize another barge, you might say as an extension.

MR. P. J. DOWLING

Thank you very much.

MR. E. F. DURRANT

Earlier today one of the briefs mentioned that barge traffic on the Slave River was not a significant factor and that locks would not be needed if a structure were built on the Slave River. Could you comment on that, please?

MR. G. R. HAMPTON

I don't feel that the marine navigation should be closed off. There is potential in the northern area. There could be at almost any time mine discoveries or anything like that which would require marine transportation into the area. Since time began it has been a navigable route for all marine traffic and I don't think this should be closed off. Although I don't know anything about engineering, possibly closure at what they call "the S-bend" could have detrimental effects on Slave Lake, more so than the weir on the Rochers. You're enclosing off a larger basin.

MR. E. F. DURRANT

Is there much traffic now?

MR. G. R. HAMPTON

No, there is no traffic at the present time. However, with the tar sands development there could be certain items of the very early structure moved through the system from the north, which would be more economical than building it on site.

DR. W. R. TROST

Captain, you've raised what seem to be two or three quite proper and practical questions. At the same time you were in a position to make recommendations to the Task Force preparing the report. I have no doubt you raised these questions while you were participating in the—

MR. G. R. HAMPTON

Yes, they were raised. We are still concerned. Regarding bank erosion, I'm not so sure we still won't lose a portion of the Athabasca, mile 141, as we're having continuous erosion there— the process has been slowed but it may still, in years to come, break through. There's very little embankment there at the present time. This could have quite a detrimental effect to the downstream delta or flats.

DR. W. R. TROST

Have you also any high or low estimates as to what the effect might be in the Great Slave Lake, which seems to me to be an important problem in your terms?

MR. G. R. HAMPTON

No, I haven't got anything on the engineering aspects.

DR. W. R. TROST

I think what we'll do, if you and Frank don't mind, is to turn the questions you've asked over to Frank, who probably will have a series of questions he'll want to talk about after the submissions are completed. Thank you very much, Mr. Hampton.

The next submission is from Mr. Hennan of Ducks Unlimited.

MR. E. HENNAN

Mr. Chairman, I have a very brief statement to make regarding the position of Ducks Unlimited with respect to the findings and recommendations of the Task Force. In view of the outstanding and obvious contribution of the Peace-Athabasca delta to the continental waterfowl population in terms of both migrating and breeding waterfowl and in view of the significance of these waterfowl locally and internationally in an economic as well as an aesthetic sense, Ducks Unlimited concurs with the recommendation by the Task Force that a weir be constructed at the Little Rapids site on the Riviere des Rochers.

In view of what Dr. Kellerhals said it should be mentioned— at least it is to my understanding that there is virtually insufficient time to start construction on the site even if it were approved this year— that we do then have time to refine the design of the weir and refine the computer analysis of the ecological effects. So, pending the implementation of the recommendation and the nature of the subsequent water regime, Ducks Unlimited will seek to participate in secondary and tertiary development measures deemed feasible and necessary to further improve the habitat for waterfowl, muskrats and other wildlife.

QUESTIONING BY THE PANEL

MR. E. F. DURRANT

Do you have any managed water areas in the delta now?

MR. E. HENNAN

No, we don't.

MR. S. R. BLACKWELL

You said Ducks Unlimited will seek to participate in secondary measures to improve habitat for wildlife. Have you got any plans prepared?

MR. E. HENNAN

No, nothing specific.

DR. W. R. TROST

I think we might like to talk with you later— you were a bit short in your submission and I can see questions occurring to us later.

May I now call on Elmer Kure on behalf of the Alberta Fish and Game Association.

MR. E. KURE

Mr. Chairman, members of the panel, ladies and gentlemen. My presentation will also be quite brief. Our interests are quite similar to those of some of the briefs that have been expressed here today.

The Alberta Fish and Game Association has followed with considerable interest the study and the proposals of the Delta Project Group and we commend those individuals and groups also who have involved themselves in this complex interprovincial question of riparian rights. We are pleased to note the recognition that these rights include any disruption of nature and its effect on fish and wildlife downstream. The magnitude of the delta change brought about by man's manipulation of a river and the effect on the people of the community of Fort Chip warrant corrective measures.

I want to make the point here, Mr. Chairman, as has been pointed out by others, that disruption of natural systems by water impoundment for any reason must not occur without full consideration of the effect upon the renewable resources as well as those people who enjoy their use. Our association is pleased with the Alberta government's announced intention to hold public hearings before any large water or environmental management project is initiated in the future.

In this very short presentation you will recognize, Mr. Chairman, that we're taking the very practical and common-sense approach to this subject, as great and technical as it may be. The lack of clear jurisdiction over interboundary waters or a central provincial authority led our association some years ago to the adoption of a policy position on water resources. The association policy favors the central authority both provincially and federally for cooperative consideration for projected river management, whether the project be public or private in origin. We believe such a central authority structure would involve the river basin interests and would avoid such happenings as the death of the delta as well, of course, as much smaller, less-heard-of disasters.

Our intention in presenting here is to recommend the following on the basis of principle, as what appears to be the best method of correction for this man-made blunder. (1) That corrective measures be instituted that will allow the Peace-Athabasca delta to return to a condition approximating that which occurred before the impoundment of the Peace River in B.C. (2) That construction of a weir on the Riviere des Rochers would accomplish the above and stabilize the fish and wildlife with some 3,000 square miles of affected area in this province. The stability of the fish and wildlife must be maintained in the interests of, firstly, the 1,500 Cree and Chip people of the area and, secondly, to accommodate an ever-increasing interest in visitors to the area. (3) That the importance of this early settlement for some 200 years, in an area that supports through the delta situation a good portion of buffalo that inhabit the region and Park, must not be underestimated.

May we mention at this point, Mr. Chairman, that I recall from some years ago when I was in the area for a couple of years that nature has not always been kind to the residents of the delta, that is the animals, birds and fish of the region have had their setbacks before. I mention it because I haven't read of any account of it here. High water at times has created great disasters which we accept as part of nature. I would mention one for the interest of people here that may not have heard of it, that even late summer high waters, that is in August, have at times caused backflooding in many of the backwaters along the Slave section, the Peace River, and one winter particularly, that I believe of 1960, there were estimates of well over 1,000 buffalo which perished in the tunnel-like conditions that were created by high waters, where the backwaters froze over and then the buffalo fell through on their migration to the winter grounds in the Lake Claire area.

The fact that the delta is an important staging area for a million waterfowl as well as being important for fur and fish that will support the residents, should give it a priority place for remedial action. It would appear that this community if stabilized can, because of the fish and wildlife, be self supporting as well as sustain a growth in commerce and people. The Alberta Fish and Game Association support the concept of a weir on the Riviere des Rochers and the employment of residents of the area in any or all of the projects. And we mention here the need, in order to maintain a system of navigation, for a minimum of disruption by the construction that may be necessary.

QUESTIONING BY THE PANEL

DR. W. R. TROST

Elmer, you've been following the discussion, of course— do you want to take a shot at saying what kind of a control structure that you're favoring? Is it the underwater weir that you have in mind?

MR. E. KURE

Well, again, in the brief we do support the concept of a weir. I am favorably inclined to the consideration that the weir might be built of a nature that it may be added to or utilized in such a way that may be a little more manoeuvrable in the way of further construction than a simple rock weir is.

DR. W. R. TROST

Thanks very much, Elmer.

Our last submission is from Mr. Jack Chesney from the Edmonton Chamber of Commerce. I'm not sure that Mr. Chesney has been able to stay with us. I believe his submission is a short one— do you want to read it, Carol, into the record?

[Mrs. Takyi here read into the record the Edmonton Chamber of Commerce brief, which appears on the following page.]

EDMONTON CHAMBER OF COMMERCE

SUBMISSION BY THE EDMONTON CHAMBER OF COMMERCE
TO PEACE - ATHABASCA HEARINGS
EDMONTON, ALBERTA

Having in mind the importance of navigation in the Mackenzie River watershed and specifically the Peace-Athabasca Delta, and the supply of water downstream for use of others, the Edmonton Chamber of Commerce supports the concept:

1. That total provision be considered for navigation by commercial vessels and barges between the Athabasca River and the Peace and Slave Rivers for the future.

2. That the supply of water should not be curtailed to a point on the Slave River at any time in the future when it would effect the construction and/or efficiency of a hydro project at Mountain Rapids in the Fort Fitzgerald-Fort Smith area, and the rapids in the Slave River.

3. That residents of the Northwest Territories in particular not be deprived of their normal water supply in Mackenzie River watershed.

Glen W. Lavold
President

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DR. W. R. TROST

We have come to the end of our regular submissions and I would like to call on Mr. Frank Forbes now to handle many of the questions that have been asked that are in his area and make any other points that he would now wish to make.

MR. F. J. FORBES

Thank you, Mr. Chairman. The comments I have I'd like to direct towards the brief which was submitted by the University of Alberta, and then there were three questions which Mr. Hampton raised.

First of all, in reference to the critique which was carried out by the University of Alberta, they looked at every aspect of it and I think, given the time that they had to do it, they made a very commendable effort. There is just one point I would like to clear, Dr. Kellerhals. When you mentioned that you hadn't received the reports earlier, I thought that we had cleared this when we met in Ottawa in early August I think, or July. Was there further holdup to that?

DR. R. KELLERHALS

Request for the data goes way back more than a year. I didn't for instance get the Lake Williston levels for over half a year, which were available, just because somebody decided that I wasn't to have them. Then we requested a Technical Report, which I know was delayed. We got it as soon as it came out, which was a month ago. Then some of my committee members said they couldn't really comment because there were no data in it; they wanted to see the appendices. I'm pretty familiar with it by now; I could have made comments on the basis of the Technical Report, but they couldn't. I made requests for the Gepac, Stanley report which I think is dated July 1972. I made a request half a year ago which wasn't answered— I finally got the report through the Authority. The appendices, which some of the committee members considered essential, we got less than two weeks ago. That is not really a reasonable basis on which to conduct a hearing of this nature, but I realize you have delays.

MR. F. J. FORBES

Just for the record, I want to make it clear that we weren't trying to withhold information. There were some people away on holidays— perhaps the summer contributed to it. I thought that when we met in my office that we had clarified we could provide drafts of the information, etc. [Inaudible remark from the floor] Oh, we didn't? We stand guilty, then, I guess.

First of all I'd like to make a few general comments. I haven't seen the brief and had a chance to go over it, neither have the members of the Project Group, and perhaps the board will want to ask us to make specific comments following this hearing. First, in terms of the assessment of alternatives, cost was not a major consideration. We certainly included costs as one of the factors but it wasn't put at the top of the list. Second, in regard to the terms of reference, you suggested that the recommendations should have included some solutions to the Mackenzie River. We had enough trouble trying to sort out the delta in two years, alongside of looking at the whole Mackenzie! We did look very carefully at the effect on Great Slave Lake and the upper Mackenzie. In terms of the flows in the Quatre Fourches we have recommended, and this refers also to Mr. Hampton's comment, we've recommended that an intensive monitoring program be carried on. We realize the limitations of the data we had and of the model work and so we recommended that this be monitored. The information that we have now, based on the computer, the model, is that the change in the flow regime in the Quatre Fourches, while it would create some further degradation, would not be rapid and that this could occur over a long long time. At present the Quatre Fourches carries roughly 10 percent of the flows. In accordance with the model, we didn't anticipate that this would increase substantially.

In terms of the flooding of the Peace delta, you refer that the solution may not help that. Again when we put the weir back and bring back the natural we will still have years during periods of high run-off when the water levels could go up to the recorded highs of 693, which would flood the perched basins in the Peace delta. Coming down to the model, to start with, we're pretty happy with that model and I think that we would like a chance to defend it. I don't know of another study where as much biological data have been compiled and put together in as short a time as Jerry and his people took with that model. We had, in addition to the people working in the project office, a number of biologists from the different agencies who critiqued us as we went along.

I think in some ways there may be some misunderstandings here. As you know, when you go to put a model together you have to make certain decisions as to the factors and the variables, and what answers you want out of the model. In this case we were hoping to get a look at the changes in the delta given the dynamic characteristics of the lake levels. If you look back at what might be considered the natural regime you find that it could go up high for a couple of years, then down very low and then it would come back on the average peaks and on the average levels. So the models and the output from them were invaluable in assessing what would happen to the delta given the different structures and their effects on the lake levels.

This raises, then, an important question, and that is really what is natural in the delta. If you were to look at page 61 of the Technical Report, we've included a flow diagram to illustrate succession on the meadows, succession on the lake bottom, and exposed lake bottom. You can see by just looking at the period of years that succession is a long-term process, and it's also a dynamic process. In years of high levels it retards the early successional communities; in years of low water these plants grow in on the mud flats.

Admittedly we were limited on data. We only had, in terms of the input for the model, the data that had been collected in the last two to three years in previous studies, but in our opinion and in the opinion of the people who were on the Technical Committee it was adequate to give us an assessment of the effects of these different structures.

There were questions raised, I think one was about the food for waterfowl, the more detailed look at the period of break-up and the relation between seasonal and annual flows. With more data this model could be extended and refined, but it would be questionable I think as to how much the quality of the answer would be improved. Also important here is that we were looking to put things back to natural. If we were going to suggest a new regime then we would look a lot harder at making statements based on the model.

I'd like to now try to come down, for the benefit of the board here, to what we would call I think the key or 'gut' issues of your deliberations. As I understand the Alberta brief, they disagree on the interpretation of the findings and the recommendation. Again, I think if you refer to page 152, we try to, without getting into a long dissertation, set out very clearly the factors in terms of recommending the structure, and you will note there that we recommended or suggested that the preferred structure in the first case would be the Slave site but that giving all the factors involved we came down to the Little Rapids site and to a fixed weir.

In my opinion we come down to two assumptions in suggesting a gated structure or regulated regime on Lake Athabasca. The first is that we could define a regulated regime for Lake Athabasca, and the second is that we could bring the different governments and their agencies together to accept this regime. Speaking of the first one, this would mean that you would have to get the different agencies to set out in terms of elevations what levels you would like in the spring, how high you would like to go in the summer, the same for the fall. In our opinion, given the wide array of agencies in the delta, this would be an extremely difficult thing to do. It would be further complicated because we know that the natural regime is a dynamic thing, that we do have years of extreme highs, extreme lows, and these are all vital to maintaining the ecological balance in the delta.

In terms of the second assumption, which would be that you could bring the agencies together to accept this. I would like to refer you to some experience which has occurred here in the prairies, and the first one would be the apportionment of water among the three prairie provinces. The Prairie Provinces Water Board was established in 1948 and it wasn't until 1968 that we got them to sign an apportionment agreement. Maybe people have changed and become a lot more cooperative in the last few years, but I think this is the type of time span you're looking at to bring people together. In the case of the Mackenzie, in 1972 I was a part of a project group which organized the first intergovernmental discussions on the Mackenzie and this involved the three western provinces, B.C., Alberta and Saskatchewan, the Yukon, the Northwest Territories and the federal government. I was responsible at that time for organizing the seminar and I had hoped that we would see some fairly concrete things come out of it in terms of specific mechanisms to review major projects. The decision that was taken, and I think it was certainly a positive first step although it didn't go as far as I would have liked to have seen it gone, was that at this time we would only exchange information. I think that this again is an example that each of the governments and its agencies has its own set of priorities and policies which it has to wrestle with, and this refers to Parks policy, say, for the delta, and the Northwest Territories' concerns about maintaining navigation on the lower Mackenzie.

You could come right back if you're one to talk about cooperation and ask why did we have the delta project. It was because we didn't get people together, and now we're going to say we're going to bring these people together and have them accept a regulated regime. My opinion is that this is not feasible. I think that we have to look very carefully at these assumptions.

The other point that was made was flexibility. We noted that the Slave site would do the best job but there would be problems with navigation, problems with a fishway— even if we put a fishway in there would be problems in getting it to operate properly in that northern area, it would be that much more difficult. There would be severe problems with ice. We put in a temporary dam on the Quatre Fourches. Admittedly it was not designed to handle ice, but we've had the top knocked off it a couple of times, once by ice, so that we've got proof positive that ice problems can be very severe. In our opinion, in terms of flexibility we felt that moving to the Little Rapids site and suggesting a permanent weir represented the least degree of man-made interference with Lake Athabasca and the delta, and that is basically the underlying principle on which we recommended the weir at this time.

In addition it has been brought out several times that we recommended monitoring programs to support this, and additional works. We tried to point out in the report that there are other developments in the basin and that five years from now or ten years from now you may have to go back and assess it, but we're talking of a million-dollar structure which we could adjust or change. That briefly summarizes the comments I had on the Alberta brief.

On Mr. Hampton's three questions, I believe I have answered the one on the Quatre Fourches. In terms of navigation in the Slave, if we were to go to that site we would put in a provision for locks. We consulted with them and in terms of the structure on the Riviere des Rochers they agreed that they could use the Quatre Fourches channel for navigation. That summarizes my comments, Mr. Chairman. Thank you very much.

DR. W. R. TROST

Just one question, Frank. On the Riviere des Rochers would you now consider putting in a device which would enable small boats to get around or over?

MR. F. J. FORBES

That was our intention right from the start.

OPEN DISCUSSION PERIOD

DR. W. R. TROST

I know it is getting late but we try to have an opportunity for comments or questions from the floor that haven't been given expression. Does anyone want to make any comments or address any questions from the floor?

MR. W. B. HUNTER

I am Bruce Hunter of Northern Transportation. I don't know if the board was quite clear on our stand on the Athabasca. I think it was Frank that mentioned that when we were consulted on it we said that as long as there is a navigation channel kept open, then we can live with it, but I don't know if the board is quite clear on the effects of low water on the delta of the Athabasca. While Captain Hampton did mention it, it was becoming a problem to the extent that the present dredging could not keep up with the drop in the water and anything that will raise the general level of the lake even, say, a foot is going to be an improvement as concerns the navigation in getting out into the lake. I don't think he mentioned when he said we put a barge in at the dock, that that was an empty barge so that we could get in if we were out over 200 feet and actually stuck getting into Chip itself, five miles back. So anything that is going to raise the level during the navigation season is going to be of assistance to us.

DR. W. R. TROST

Well, you're really then speaking in favor of the installation of the weir?

MR. W. B. HUNTER

Or some device. I just didn't want to leave the impression that the status quo was satisfactory. I can speak a bit from experience in saying that we have had the highs and lows in the past. In 1938 there was the lowest water that ever existed in that river, both the Athabasca and Lake Athabasca. In 1936 there was just about as high a level as we've had; if you look at the records you'll find that the lake was way up. So these things have occurred, but I think that your spread is shortening. In other words, the difference between the peak and the low level of the lake in any given season is shortened because of the fact that the Peace does not flow back into the Athabasca and act as a stopper at the same time as adding to the actual level of the lake.

DR. W. R. TROST

We're naturally very concerned about the transportation on the Mackenzie, particularly with the prospect that there might be quite heavy use of it in the immediate future.

MR. W. B. HUNTER

Well, I'm strictly talking about the Athabasca at this stage. The Mackenzie is different in that you have a bigger body of water as your surge tank in Great Slave Lake and as a consequence you don't get quite the fluctuations that you get in Lake Athabasca. It's a much smaller body. For instance, this year I think there was 10 inches of rain around the McMurray area. This is felt right down through the navigation system as far as Lake Athabasca goes, but you wouldn't even notice the effect it would have on the Mackenzie transportation.

DR. W. R. TROST

So apart from the point that you've mentioned— the exit from Great Slave Lake, the rapids there— you have no concern about the effects on the Mackenzie system?

MR. W. B. HUNTER

Oh yes, if you were going to have any large structure, in other words if you were going to raise the level of the lake five feet and keep it there, naturally you're going to have some downstream effects.

DR. W. R. TROST

Even on the Mackenzie itself, past the Great Slave Lake?

MR. W. B. HUNTER

Yes, particularly the critical area from Great Slave Lake to the Beaver Lake down through Providence Rapids.

DR. W. R. TROST

Thank you.

MR. J. J. KINISKY

Is your normal navigation route along through Fletcher channel up into Lake Athabasca?

MR. W. B. HUNTER

No, it's been years since . . . . I'd say about 1937, 1938 was the last time Fletcher channel was used.

MR. J. J. KINISKY

And it's the formation of deltaic material at the outflow of the Big Point channel that's giving you the problems. I see.

MR. W. B. HUNTER

I think I can say that in my time, which is 37 years there, we have gone from small boats that used the Embarras channel, then the

Fletcher channel, then the Big Goose channel and now we're out to Big Point channel, and this one has to be kept open or that's it as far as transportation goes.

DR. W. R. TROST

Further comments or questions from the floor?

DR. W. M. SCHULTZ

Mr. Chairman, I'd like to thank Mr. Forbes for giving the *ad hoc* committee of the Science Advisory Committee the title of the "University of Alberta group". It's indeed true that four of the six members are associated with the University of Alberta, but I think it should be stated correctly that we have been asked to serve on an *ad hoc* committee of the Public Advisory Committee to the Environment Conservation Authority. If it hadn't been for this fact I would have submitted my own brief, and I might have stated a few things more clearly or more pointedly than I did otherwise.

I'd like to ask a question. Do you think, Frank, that the interference that created the present calamity we're in is anything less than the kind of milk-toast approach that you propose towards minimum interference? Don't you think it is necessary to have as much human interference as is necessary to offset the initial one?

MR. F. J. FORBES

I think the answer to that is, what are the needs of the area. Because we had man go in and bugger it up once doesn't mean we should try to play around with it to our own gain. And certainly in the Project Group we tried to look at the delta and say, okay what are the needs of the National Park, what are the needs of the local people, and in terms of the trapping and fishing what are the needs of Fort Chipewyan and the Territories in terms of navigation, and from this set out the requirements and the objectives that we should work towards in terms of a solution. This, very simply, is the approach we took.

DR. W. R. TROST

Your answer to Wolf's question is kind of "yes"?

MR. F. J. FORBES

Well, I'm saying "no". I'm saying what are the needs of the Parks people, and the Parks policy is to put it back to natural and don't interfere with it as far as possible, so that's one of the major requirements in looking at a solution.

DR. W. M. SCHULTZ

Thank you, Frank. I fully agree with you. I think we should look first at the needs and only secondly or thirdly at how much interference it takes.

MR. J. RIDLEY

My name is Jim Ridley and I speak on my own behalf. Both my questions refer to the Bennett Dam. Is there any cooperation right now with the amount of water that's released from the Bennett Dam at different times throughout the year? Also, is there any siltation occurring in the Williston Reservoir there and does this not have a bearing on the delta?

MR. F. J. FORBES

In regard to the first part of your question, B.C. has provided data on their releases and there is no discussion with them regarding their operating procedures for release of flows. In terms of the second question, there will be some sediment in the Williston Reservoir. I can't comment on how much it is, I think they have experienced some problems of degradation downstream from the dam. There's a representative from B.C. Hydro here today— as it's a technical question he might be able to comment on that if he wishes. Mr. Goines?

MR. W. C. GOINES

I don't think I'm in a position to comment.

MR. F. J. FORBES

I think you did have some problems with bridges, just as a matter of interest.

DR. W. R. TROST

Further discussion or comment?

MR. W. ANDERSON

My name is William Anderson and I represent the native people. My question concerns the time period from the conclusion of this hearing up until the actual implementation of the dam, or whatever. How long will that time span be?

DR. W. R. TROST

I understand from the comment of the Minister this last week that construction work might begin next summer if the decision is to go forward.

MR. W. ANDERSON

Thank you.

DR. W. R. TROST

Further discussion or comments?

Ladies and gentlemen, it's been a great pleasure to have you all here and I think we had a very good hearing. Thank you all for coming.

[ADJOURNMENT OF EDMONTON HEARINGS]

THE RESTORATION of WATER LEVELS in the PEACE - ATHABASCA DELTA

SUPPLEMENTARY SUBMISSIONS TO THE AUTHORITY

ENVIRONMENT CONSERVATION
AUTHORITY
ALBERTA

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FEDERATION OF ALBERTA NATURALISTS
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THE RESTORATION OF WATER LEVELS IN THE PEACE-ATHABASCA DELTA

A Brief Submitted by

THE FEDERATION OF ALBERTA NATURALISTS

Presented to

THE ENVIRONMENT CONSERVATION AUTHORITY OF ALBERTA

OCTOBER, 1973

The Federation of Alberta Naturalists are pleased to have this opportunity to make a few comments on "The Restoration of Water Levels in the Peace-Athabasca Delta."

We are in favour of the proposal for at least effecting partial control of waters outflowing from Lake Athabasca and the Delta to ensure the preservation of deltaic marshland productivity, such that there would be a return towards the "natural" state which existed prior to construction of the Bennett Dam on the Peace River. We stress the need to restore the "natural" water regime on the Delta without delay, so that further deterioration of the deltaic marshland productivity will be alleviated. This large deltaic marshland is unique in many respects and supports or supported a large population of wildlife. Many of the local residents of the area depend or once depended on the wildlife, especially a large muskrat population, for a traditional hunting and trapping existence. The marshes of the Delta area are also most important as breeding and resting areas for large numbers of waterfowl which arrive from and fly to most areas of North America. Further destruction of this most important breeding and feeding area could adversely affect the populations of our North America waterfowl.

We support the suggestion for a structure at the Little Rapids site, and the removal of the temporary Quatre Fourches impoundment. Proposals for sites at Revillon Coupe and in the Chenal des Quatre Fourches, wholly within Wood Buffalo National Park are undesirable in a natural park setting. A structure at the Little Rapids site at least has the advantage of being on the National Park boundary and we would hope that the required rock and other necessary local material will be obtained largely from outside the Wood Buffalo National Park boundaries, so that the natural features and aesthetic values of the National Park will not be impaired.

The construction of a weir or other modifying structure at the Little Rapids site on the Riviere des Rochers appears to be the minimum necessary to ensure that the Delta area maintains its natural physical and biological characteristics, and that the natural values of Wood Buffalo National Park are not adversely affected. If the construction of a structure at this site is approved we would like to see further consideration given to providing a gated structure, with adequate fish ladder access if necessary, to ensure the possibilities of having a greater degree of water level fluctuation on Lake Athabasca than the anticipated control levels for the proposed submerged weir structure of 685 to 689 feet. Characteristically during the last hundred years the water levels have annually fallen below the 685 foot level and on occasions above 690 feet.

In conclusion we wish to digress slightly from the main topic under discussion, and request that the members of the hearings in their report should include a section indicating the desirability of including a major portion of the sand dunes on the south shore of Lake Athabasca in an ecological reserve or natural park category giving similar degrees of protection. These dunes like the Delta area have unique natural features and should be preserved for all to enjoy and study. We understand that an area of the sand dunes in Saskatchewan, coming to within a few miles of Alberta, has been proposed as an ecological reserve. We suggest therefore that the three governments represented on these hearings should look at the desirability of having one or more large portions of these sand dunes protected and preserved for all time.

John M. Powell
President

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Here I am telling you about my way of living in a house. My daughter is going to school in a house with broken window and door in winter. When I get up it is so cold that I have to make fire for her to go to school and the wind comes through and is so cold. So that's where she goes to school from.

When we told them to make a house for us they say "after". When will "after" come? We never got a house. Now if your chairman wants to come and see the house, come. We tell them to give us things to make a house, which they never.

So that's why my daughter does not go to school always. Because our house is not good for the winter.

So that's how we live.

From Rosalie Tourangeon
Fort Chipewyan

[The following are essays written by students of the Bishop Piche School in Fort Chipewyan.]

There should be an all-weather road here in Fort Chipewyan, leading to Fort McMurray and Fort Smith. Then the food and clothing will be a lot cheaper. The transport trucks could bring more goods than the airplane could. Besides the freight costs more in the airplane than it does in the transport trucks. When the students are going for the sports in Fort Smith they won't have to wait till the winter road is open. They could go any time of the year. Or when they want to go to Fort McMurray they won't pay half as much as they do in the airplane. They could go by the bus. It will be easy to go out of town, and it won't cost so much. Maybe if the road is made, some tourists will come and spend their summer holidays here. Then in about a couple of years time this town will be a lot bigger than it is now. Especially if some company came in and ran some kind of business here. And there will probably be a lot of jobs for men too.

Julia Marten

There should be a road into Fort Chip at all times so we could get all the fruits and vegetables that we don't have all the time. There would be a form of transportation at all times if the road was made. People would not have to wait till winter comes to go to other towns or places out of Fort Chip.

The plane fare is about $10.00 to $12.00. The food will be cheaper because the freight truck will be able to come in any time. The barge won't have to come every two or three weeks. People won't have to wait for their car or truck to come in, or barge. They will just have to go out by plane, then drive his or her car into Fort Chip.

Tourists can come in and study the landscape or take pictures of the landscape around Fort Chip. There might be bigger industries around Fort Chip. The fishing industry might not be the only one in Fort Chip. The people will be able to make more money on the new jobs that will be provided for them. The interscholastic teams won't have to go to other places to compete against other teams only in the winter time. They will be able to go in the summer, around May, June or other months during the summer or spring. If the Grade 9 go on a week's trip to Yellowknife or somewhere else they could easily go all the way by our school bus. This year when the teams will be going to Fort Smith and Hay River they would have to go in the winter time. If the road was built we could easily go when the weather was warmer. If the road was built the lumber for the new gym could come by truck and some by barge. It would be easier for the barge; it won't have to bring all the lumber. The school won't have to pay so much money for the transportation of the lumber into Fort Chip. If someone wanted to go to Edmonton over the vacation he would just have to drive down there. It would take time to get to Edmonton but it would be worth while because he would be seeing the stuff he never saw before, like the scenes along the road.

That's all I'm writing. There may be more to write but I can't think about them.

Raymond Gladue

What the young people would like is a recreation hall. A place where they can gather with their friends and do anything they like. There should be booths or tables where they can have coffee, pop or have supper. They should have a jukebox in there, in case anybody wants to play songs. They can also have games like table tennis or ping-pong. Also shuffleboards and pool tables. They should have a gym built onto this recreation hall, where they can go and play basketball, volleyball or any other sports. This gym could also serve as a place where they can go and practice if they have to play intra-school games.

Adults shouldn't be allowed in the recreation hall. The kids could run it themselves. They probably won't allow drinkers in there and any fights. This place would be just for teenagers from 12 to 19, not older than 19 or younger than 12. Or it would be better if they were older than 12 and about as old as 23. But people older than that probably would not want to go in there because there will be only kids in there.

We would also like an all-weather road going out of Fort Chipewyan. We'll get fresh fruit and food coming in. Then we wouldn't have to wait for the barge that comes in irregularly. Without the road we just have barges in the summer and Monarch trucks in the winter coming into town. If we get this all-weather road, people could go in and out of town any time. We'll probably get lots of tourists when we get the road. The people of Fort Chip could sell moccasins, mukluks, jackets, necklaces and other things that they make out of moosehide and beads. The people would certainly make lots of money that way.

Lucy Tuccaro

There should be a highway coming to Fort Chip from Fort McMurray and one from Fort Smith. The one coming from Fort McMurray should be all-year so we can save money by transportation. By transportation I mean we can go to McMurray by car or truck to buy something like boxes of food and clothes or if you go for a holiday out in the city or somewhere around Fort McMurray you don't spend a lot of money this way. But they who are going to build the road are going to spend lots of money and it will take them a long time to make the road because this part of Alberta is a rough country, lots of small lakes and rivers and some places are muskegs. Muskegs are like ponds and soft ground will make it harder. When the road is made there will be all kinds of tourists around. And the road to Fort Smith should be only in the winter; because they have to spend too much money to make a road all-year they should have a road only in the winter time.

John Robillard

It will be good if we had an all-weather road going to places. But I guess it will cost money. The road will be for transportation. We would have some fresher vegetables and fruits coming by the trucks or Monarch. It will be good if it is an all-weather road because people don't have to wait for winter till the winter road opens. The food will be cheaper. Transportation will be cheaper because we don't really have to travel by plane (P.W.A.). If the road opens maybe some drugs will be here just like marijuana, all kinds of the stuff. Some other kind of disease will be here. Some tourists maybe will be in. If the road opens probably some bars, cafes will be in Fort Chip. Maybe some men will make some industry in Fort Chipewyan, if it happens some men come here from outside. Some trappers won't have to go by dogs, they could go by some vehicle.

Marvin Vermillion

There should be an all-weather road into Fort Chipewyan. I think they should make an all-weather road to Fort Smith because from Fort Smith there is an all-weather (Trans Canada) highway that goes all over Canada.

It would make Fort Chipewyan bigger, because probably there are some companies in Canada who want to put up their companies in Chip.

And this town would become a city. And probably the government might put a highway to Fort McMurray; because it would be an all-around road to Fort Smith we'll come back to Chip by Fort McMurray.

And some industries would give the Indian children some work so that spring time the children and teenagers can be busy so that they can't get into trouble.

And some companies might put some TVs and other things in Fort Chipewyan. This town and companies can all be together and would be powerful, to get things from the government.

But now there are not so many people in Fort Chip. They are not so strong to get things from the government. But with the highways companies and industries would be moving into town. Fort Chipewyan would be a big town.

The people of Fort Chipewyan would be strong with all the white men, companies and industries. They could vote for the things they need. The government would give things then, because they know that Fort Chipewyan is a big town with so many people. They would just give them.

Fort Chipewyan then might become a city. Jobs and other things would be available for the people of Fort Chipewyan.

With the all-weather road, food would be cheaper. TVs, jobs, etc. would be available.

The only problem would be pollution, killing, drugs, trouble. But I think it would be solved by the police, because there would be more police.

I hope there would be an all-weather road into Fort Chip from Fort McMurray to Fort Smith.

Raymond Tuccaro

In Fort Chipewyan they should have a place for the children to go and hang around without their parents or older people around. Preferably a recreation center. They should also have a theater with lower ticket prices. They should have a dance hall only for kids 14 years old to 18 years old where no drinks are allowed inside. They should have an indoor swimming pool and they should also have a playground for kids.

In Chip they should have jobs for teenagers after school and weekends. They should have a high school here so that the Grade 9 students don't have to go out of town and then they usually drop out because they get lonely and the people in town don't have enough money to bring the students back every long weekend. So then it will be a lot better if they had a high school so that most students won't quit school.

Beverly Laviolette

The town should have a drop-in center, or else a recreational hall for teenagers only. There we can go and do things without any adults around, or the town should have a summer program for students, where we could go camping, hiking and canoeing. The Indian Affairs could provide us the canoes and other stuff we need. As for the camping the kids could bring their own things such as their blankets, etc., in other words whatever is needed. There should also be a fee, about $10.00, so that can get the food we need or some other things. We could get some people from the town who know things about the wilderness to help us with our programs. Some of the kids may help also with other things. There should also be an age limit, about 14 to 16. That way we won't have to take all the little kids. The girls and boys should have permission from their parents if they could come or not. There should also be rules.

Helen Wandering Spirit

The teenagers should have some place to go and hang out after school or on weekends, where the adults won't chase them away. They should have a day-care center where the students can watch the children. They should have a better theater where the kids can go and enjoy themselves. They should have a pizza parlor where the students can go on lazy Saturdays. They should have a dance hall where they can have cokes and play games like checkers, tennis, badminton, volleyball, etc. They also should be able to do anything they want when they're at the hall or whenever they are without the parents bugging them.

They should have an indoor pool for the children where they can splash around and fool around without their parents worrying about them drowning. They should have a park or zoo where the kids can go on Sundays with a lunch. The teenagers and kids should be trained to canoe and do all kinds of outdoor activities. They should go camping and learn how to cook outdoors, like barbecuing and etc. They should have swimming lessons and have someone look after them while they're swimming.

Marina Whiteknife

The young people in Fort Chipewyan should have a recreation hall, where young people can get together and meet other young students. They should have booths where you sit down and have coffee or pop. They should have a jukebox where they have records and play music. Also there should be a lot of games in there like pool table, shuffleboard, darts, ping-pong, table tennis and other games. And sort of a little store in there so they can buy some candy, cigarettes and etc. The young people could do anything they want to do in this recreation hall. There are a lot of things young people should have, like a dance hall. The young people could make a band for themselves. If they have money they could buy drums, guitars and whatever they need. They can also have a canteen where they sell things like cigs and candy, chocolate, coke and coffee or tea. The dance will be starting about 9 o'clock and end at 10 o'clock and the adults can go to the dance too if they want to. But they only see young students in the dance. They can also have a cafe and cafeteria for themselves, if they built up another gym. The students can decorate the cafe and cafeteria for themselves. They can have their own meals in the cafeteria. Some of the kids can have lunch in the cafeteria if they don't want to go home for lunch. I mean the kids from school. Some of the students can take turns working in the cafeteria. Half of the gym can be a cafeteria and the other half can be a cafe. The Grades 7, 8 and 9 can have coffee in the cafe at recesses. If they feel up to it. They wouldn't have to pay for the coffee and cookies. The ones working at the cafe or cafeteria can have free meals. They could work two weeks each and they'll get paid. They also select one student for a boss of the cafe and cafeteria. So the boss can pay the ones that are working there. Whenever the adults go and have coffee or a meal they will pay for it, so the boss will keep the money in his office, or the principal of the school can keep the money. Probably the boss will steal some of the money, if he keeps the money. The students can also have a pool hall for themselves where they have these big tables called pool tables, with a canteen in it and some other games like a shuffleboard and a Hot Line. Also a little coffee in it, so the students can make their choice if they want to play shuffleboard, pool or Hot Line. It's up to them if they want to have coffee or pop in the coffee shop. They can also have meals there. Also with a big jukebox in there, so they can play music. There are a lot of other things young people want for themselves; I wouldn't be able to mention everything in this book.

Betty Cyprien

There should be a dance hall for the kids where no adults are allowed. There should be a cafe and a drop-in center where the kids could go after school and on weekends. There should be a day-care center where the kids could work while the mothers go out to work. The people should build a hall where the kids could go and play games, like tennis, badminton, etc. They should build a swimming pool for the summer and an indoor swimming pool for the winter. The school should be open at nights for badminton and basketball, etc. for the Junior High. They should build a better theater where it will be nice and quiet. There should be Girl Guides for the smaller kids and the kids should go out camping or hiking sith someone. In the summer there should be picnic grounds where the people and their kids could go and have dinner on Sundays. There should be a pizza parlor where kids could go and have a pizza and coke.

Bernadette Mercredi

Now, or in the summer the kids don't have anything to do except doing the things they should not do. So the best thing that they can do is to try and put up a summer playground or something as recreation for the children during the summer. They had a summer playground about three years ago that was put up by Alberta Newstart. The recreation ran good, many kids went to it for something to do. It was at the Catholic Parish Hall. It ran for two months and the kids went from the ages 9-16 years, and a kindergarten school was held at the Community Hall for the ages 4-6. So I think the best thing to do is try and put up a recreation next summer or some time next year. First of all they can try and find a hall, or even a large house where fifty or more kids can go into. They they can fix it up so when the kids go to it when opened they can start right away. Then when that's done they can get students that were in Grade 9 and pay them each week, so that they can save for the new school year in another place. Or if they want another recreation they can start another one at Doree Lake for the two months. They can drive the children there by bus each morning and bring them back each afternoon. The students that are in Grade 9 that year can work there, so they too can earn money for the new coming school term in another place. The things that they can do at Doree Lake are the students can try and clean up Doree Lake to look like a camping or picnic grounds in the summer. They can build more tables and benches and clear more place for the people, or they can teach the young children how to swim or take them for hikes around Doree Lake, or they can teach them outdoor cooking. The only thing is to try and get the kids at Doree Lake each day and the students should try and help the children on what they really want to learn at Doree Lake or at the summer playground or whatever they put up for the children. I think the kids would like something for them to do in the summer.

Margaret Vermillion

We should have a recreation hall for recreations, that is if other kids agree and accept the idea. Recreations should begin in the summer. Any student or even teenager could work and get paid at least every two weeks (just in case, you should pay them, for they might just quit). The work should be cleaning up Doree Lake, or help Charlie Simpson teaching little kids and teaching them anything that is good for them and all that stuff. While in Doree Lake, kids (girls or boys) should at least clean up the beach and pull out any unnecessary roots or plants in the beach and near the tables, and they should throw the garbage into the big garbage cans that are there. I don't see why we shouldn't get recreation this summer. I think it would be nice to have recreation and I think it would be fun if those who are working cooperate in everything.

Irene Marcel

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